POPULAR Computing WEEKLY

35p 27 January-2 February 1983 Vol 2 No 4

This Week

Dragon softwars

Keith and Steven Brain take a look at independent software for the Dragon 32 computer See page 12

Quicksilva plans

David Kelly interviews John Hollis, Quicksilva's Technical Director, and discusses plans for a new range of software and games See page 10.

Vic sound

Jim Parren explains how to create a keyboard bleep and Cyril Aubry introduces a new routine for drawing circles See page 23

Dragon graphics

David Lawrence continues his program on mixing text and high resolution graphics See page 25

★ STAR
Surround on Spectrum
by David Oxley.
See page 8.
GAME ★

News Desk

Acorn to launch Electron in March

ACORN Computers is to launch its long-awaited Electron micro in March for sure, according to managing director Chris Curry

It will be priced at £150 pitching it very close to the Sinclair Spectrum and Oric 1, with which it is intended to compete

The Electron will offer, essentially BBC computing at a rock bottom price It has the same basic keyboard although with slightly fewer keys and the same screen display, though without the highest resolution graphics option All the keys will be user definable for maximum flexibility That means you can redefine the whole keyboard if you want to make a special version of the machine to do a specific job says Curry

Continued on page 5



Chris Curry Acorn's Managing Director

Software series for 64

COMMODORE has announced details of its initial software plans for the new Commodore 64 micro computer

Gortek and the Micro Chips is the first offering — a guide to simple Basic programming presented in the form of a space adventure game *Gortek* is available now price £12 95 in two cassettes containing 12 chapters of the 'space lessons and a 44-page Basic teaching book

Also available is the *Simon's Basic* extended Basic and graphics cartridge giving 114 extra commands The structured Basic gives *Proc If-Then Else* and tool-kit type commands The additional graphics commands include *Circle, Paint Draw Trace* and *Arc*

February should see a range of business and utility programs — *Easy Script* word processing *Easy Calc* financial planning *Easy Stock* stock control and *Easy Spell*

The first games material will follow in March

Computer Swap 01-930 3266

Free readers entries to buy or sell a computer
Ring 01-930 3266 and give us the details

WANTED ZX81 to swap for Mica Walker drop handle 5-speed immaculate condition + extras Ring 0254 884787

SWAP MY DRAGON 32 (3 months old) for your Spectrum 48 Please phone 0808 311 824 office hours — ask for Mr Amos

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VIC20 + 6 cartridges inc super expanded sargon chess jelly monsters + books + software worth £70 combined value £370 Will sell for £230 ono Tel 01-868 0511

MACHINE CODE MONITOR Pirate Cove adventure Intro to Basic, part 1 Several games cassettes for VIC £56 ono Tel 0703-432 810

VIC131 cased fan-cooled cegmon 8K Ram £120 Tel Greenwood Skipton (0756) 80817

ATARI VCS plus 7 cartridges including Defender Missile Command plus tennis plus ice hockey £130 00 ono Tel 01-455 1167 after 6 pm.

16K EXPANSION + machine code monitor for Vic20 £85 ono Tel 01 202 3624

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★★ BRITAIN'S HOME COMPUTER WEEKLY ★★

POPULAR Computing WEEKLY

27 January – 2 February 1983 Vol 2 No 4

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All submissions should be typed and a double space should be left between each line Please leave wide margins

Programs should, whenever possible, be computer printed

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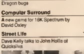
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Editorial

Ham, the first chimpanzee in space died in an American zoo last week Twenty-six-year-old Ham established himself in the record books in 1961 when he was launched into space as a prelude to America's manned space program

The death of a chimpanzee, even one as notable as Ham, might not seem to be a particularly memorable occasion But, it is an indication of the passage of time

The last 20 years have been marked by some of the greatest achievements in man's history We have put men on the moon, created babies in test-tubes and transplanted hearts We have also run faster, built higher and travelled further than ever before

But, the advent of cheap, easily available, micros may yet have the most impact on our lives The micro revolution that is taking place almost unnoticed is going to change the way in which we live, work and even the way in which we think This is the age of the micro, if not the train

Ham was a pioneer of the space age, just as the ZX81 is a pioneer of the micro age Twenty years from now people may well remember the ZX81, I doubt if they will remember Ham

Next Thursday

Can you survive Tank Battle, a new Star Game for the BBC Model B? Mike Grece takes a detailed look at the new range of adventure games for the Vic20. Plus, find out who made it to the second round of Battlester.

Electron plans

Continued from page 1

The Electron will use BBC Basic, and Acorn s intention is to make most of the Acornsoft sofware for the BBC machine available for the new machine at the time of its launch The operating system is only marginally different but, according to Curry, where a progam requires modification there will be a special Electron version

Savings have been made by tearing away all the interfaces which make the BBC micro such a flexible machine The Electron will be offered with only a tape interface and VDU output Eventually, a set of modular interfaces which plug into the back will be offered Using these will upgrade the machine to BBC Model A standard, but the combined price of Electron plus add-ons will be as high as that of the Model A

Chris Curry believes that the market into which Acorn will be selling the Electron likes add-on modules "We are only producing these modules in order to compete with the market leader, which is undoubtedly the Spectrum" he said. Joysticks and games paddles will be relatively cheap add-ons — Econet networking and disc systems will cost rather more

Together with a range of fast games software, Acorn's change of direction is indicated by its move into the high street The Electron microcomputer is to be sold through the retail chain stores, though Curry has yet to finalise the details At the same time — like the company's other computers — Acorn will sell the Electron by mail-order

TI aims product at Sinclair computers

TEXAS Instruments has announced details of a new low-cost microcomputer and high-speed mircodrive' data storage unit

The new 16-bit micro, the TI 99/2 will go on sale in the UK in July "It has 4K user Ram and will sell for well under £100 — nearer £70 than £80" according to TI's product marketing engineer, Robin Frowd.

The machine is without colour and sound but is expendable in 16K units to 36K Based on the TMS 9995 16-bit processor it is heralded as being considerably faster than the TI 99/4A machine which uses the TMS 9900 chip

The new machine has a Rom cartridge slot and is fitted with an RS232 interface

Most software in Basic for the 99/4A will run on the 99/2, but without sound and colour routines Unlike the earlier machine, the 99/2 also has a full assembly language programming capacity

At the time of launch the new computer will have about 20 programs available for it on cassette Two Rom cartridges will also be available — *Learn to Program* for languages such as Forth, and *Learn to Program in Basic*

Two new peripherals have also been announced to accompany the new computer

A super high-speed 'wafer-tape' drive has been announced This unit has a capacity of 50K with a data transfer rate of 8 000 baud, and connects to the computer via the RS232 interface It is expected to cost £150

A four-colour printer/plotter will also be released Although the TI 99/2 is a monochrome machine, the colours of the printer can be addressed from the computer

New Apple micro as IBM gets UK debut

APPLE Computers has publicly shown its new Lisa micro for the first time in the same week that IBM has announced the long awaited UK launch of its Personal Computer

Lisa — a mnemonic for Local Integrated Software Architecture — "represents a new concept in microcomputing" according to Apple sales chief Keith Hall

The Lisa unit offers a package of integrated hardware and software allowing more than one software package to run at the same time It is operated by an exciting new device — the 'mouse' This small desk-top peripheral, used to direct a sophisticated cursor-controlled pointer, replaces many of the usual functions of a keyboard

Apple s new top of-the-range 16-bit option will go on sale in the UK some time in later summer The complete package — mouse' keyboard, processor, display, twin floppy-drives, single hard-drive, and the range of integrated software is expected to cost in the region of £8000

In the same week as Apple s announcement, IBM has chosen to launch its Personal Computer in Europe

Starting at £2080 the basic machine with 64K Ram single 160K floppy drive keyboard and monochrome monitor, is the smallest and least expensive IBM system

The machine will be manufactured at a new IBM plant in Greenock The decision to build IBM PCs in Scotland will create up to 400 new jobs



Sinclair worth £135·9m

FOLLOWING the successful sale of 400,000 Sinclair Research shares — 10 per cent of its equity — to a group of city institutional investors, the company is valued at £135 9m

The sale makes Clive Sinclair's 95 per cent share of the company worth £129 1m

The £12 7m realised by the share placement will go to Sinclair's electric car project which now requires additional funding Clive Sinclair explained the decision 'I believed it inappropriate for Sinclair Research to fund this project further because of its long-term nature"

The company, heading for pre-tax profits this year of £14m is to seek a listing for Ordinary Shares in the "reasonably near future'

Pro Joysticks



THE new self centering Competition-Pro joystick by Coin Controls is now available for the Spectrum from Kempston Microelectronics

The unit has eight directions and two fire buttons

The joystick costs £26 including post and packing from Kempston Microelectronics, 180a Bedford Road, Kempston Beds

Versions are planned to operate with the Vic20 and Atari machines Further information from Coin Controls, New Coin Street Royton, Oldham, Lancs

Pixel merger

PIXEL Productions, the London-based ZX81 and Vic20 software house has appointed Quicksilva to market and distribute its cassette tapes

"Pixel's material will continue to be marketed under its own banner but Quicksilva now has exclusive distribution rights in the UK, ' says Pixel's Joe Gillespie "The business is going so well I found I couldn't cope" he explained 'I intend to carry on writing software "

Down to earth with a thump

Re Monkey Puzzle November 18 page 35 Boris Allan's reply to S Kane on this topic (*Letters*, January 6) is clearly incorrect

If, initially, monkey and stone are balanced on either side of the pulley and the monkey succeeded in raising the stone it would require that an additional length of rope be transferred to the monkey's side of the pulley Monkey and stone would therefore not rise at exactly the same rate as stated by Boris Allan As soon as the stone began to rise the two sides would no longer be in balance due to the excess weight of rope on the monkey's side The monkey would therefore come down to earth with a thump on his rump

And all that is leaving aside the question of whether the monkey actually will manage to move the stone

David Bullmore
Clovereley Villa
Daw Lane
Horbury
West Yorkshire

Personally, I feel sorry for the monkey who has been variously described as climbing to the top of the rope, raising the stone to the top of the rope, causing both himself and the stone to rise to the top of the rope and now falling to the earth on his rump To spare him any further indignities I suggest he be left in peace, wherever that may be

Can someone help on Tandy?

Does anybody know whether the Tandy EDT/ASM 6809 assembler cartridge will work with the Dragon 32? I know that a number of the Tandy cartridges do work on the Dragon as do some of the machine code cassettes (specifically *Bedlam* the adventure game)

It seems that anything requiring access to the printer port will not work The machine code screen dump program available from Tandy does not work, as I know to my cost, so it seems likely that the word processing cartridge *Color Scripsit*, which probably utilises similar subroutines cannot be used Therefore, does anybody know of any word processing programs for the Dragon 32? I am not looking for *Wordstar* capabilities just something for routine correspondence

Here's hoping that you, or someone 'out there' can help

P J Welch
6 Greenhithe Road
Leicester LE2 7PU

Freaked out on Horace

Your review of Spectrum games in the January 6 issue was very informative I have several of the games that you tested, and like you, I am addicted to *Hungry Horace* That is, I was!

I have now found the secret of the game and my best score has jumped from a nail biting 8 970 to a totally relaxed 44,000 and a score of 100 000 or 'off the clock', is quite possible

I will not divulge the flaw which allows you to cheat so easily, for fear of leaving other *Horace* freaks as miserable as myself

Life has lost all meaning for me now that *Horace* has lost its challenge Keep reviewing the games so that perhaps I can find a replacement

David Pountney
105 Coningsby Drive
Kidderminster
Worcs

Having played *Hungry Horace* a few times myself, I must admit that my score fell well short of a nail biting 8,970, never mind a totally relaxed 44,000. I do not know if any of our other readers have found a flaw in *Hungry Horace* — I certainly have not.

If it is any consolation, you can now purchase *Horace goes skiing*, a sequel to the original *Horace* program. Written by Psion, in conjunction with Melbourne House, this program will run on either a 16K or 48K Spectrum. As far as I know, it has no flaws.

16K rammers in the majority

The only statement which comes to mind when reading J Ashbourne's statement (January 6 issue), that "16K Rammers" are in a minority is "preposterous balderdash"

Many of my schoolmates have ZX81s, all *16K* The number of firms manufacturing 16K Rams eg Memotech, JRS, Ground Control Uncle Clive etc, are very high How many schoolkids or adults want to pay out for a 32 or 64K Rampack? I'm sure that a poll would prove us so-called "16K Rammers" in a majority

As for Mr Ashbourne's m/c compiler, I suggest he makes sure a program fits his needs before he buys it

Joe Walker
43 Crossley Lane
Mirfield
W Yorkshire WF14 0JW

Mathematical patterning

I enclose a short Spectrum program that produces a pleasing mathematical pattern that readers might like to run

```
10 FOR X=1 TO 175 STEP 15
20 PLOT COS X*X, SIN X*X
30 NEXT X
```

I must also thank you for producing such a good computer magazine, though I must admit to one gripe — the number of letters printed that refer to Spectrum bugs (three in Vol 2 No 1) I feel is excessive A minority sport I would have thought, with dubious usefulness to most Spectrum users Could we call it a day on bugs please

Peter Murray
151 Maidstone Road
Felixstowe
Suffolk

At your commend

I refer to David Nowotnik's article in today's issue of *Popular Computing Weekly* (January 6) The program on page 24 (fig 2) contains two bugs First, the loop variable in lines 210 to 230 should be *y* not *j* Secondly the *Data* statement (line 130) contains one too few entries (ie only 23 instead of 24 as required by the *Read* statement (line 110)

I would very much like to be able to *Peek* and *Poke* the ZX Spectrum display file, and I would therefore be pleased if you could publish the corrected program

L A King
82 Tedder Road
Acomb
York YO2 3JF

You are quite correct Line 210 should start *For y=190* — not *For j=190* Line 130 should read.

```
DATA 6,6,62,6,230 7 79,201 6,6,
62 6,230 56 79,201 6 6 62,6 230
182,79 201
```

Auto-repeat on Dragon

In reply to Peter Chase's request for other ways to get repeating keys on the Dragon (*Popular Computing Weekly* December 30) I would like to submit the following routine It utilises the location 337 to give auto-repeat on certain keys The subroutine prints a square on the screen If you press *1* the square moves to the left and if you press *9* the square moves to the right

I think this subroutine may come in useful if Dragon users would like to move a "bat", as in a break-out type game, or if they would like to add variety to their programming by not having to use *Inkey$* like most people

```
10 R$ = CHR$(143)+CHR$(128)
   +CHR$(143)
20 x = 430
30 PRINT @ x R$
40 IF PEEK (337) = 253 THEN
   X=X+1
50 IF PEEK (337)=254 THEN X=
   X-1
60 GOTO 30
```

Kerry Muckart
23 Sawtry Close
Carshalton
Surrey

Rectifying bugs

After purchasing my Dragon at Christmas I was horrified when I started reading the manual The first program I read had a bug in it

Having gone through the manual, I have found a bug in most of the programs Some bugs were typing errors and some just the logic of the program Most of these bugs can be rectified if you have had previous experience of using the Basic language but if you know nothing about Basic and just type in the program it can be very disappointing to receive an error for your efforts!

I have also discovered the true amount of memory you have left I worked it out with the aid of the following program

```
10 LET A=MEM/1024
20 PRINT "YOU HAVE A K OF
   MEMORY LEFT"
```

Adrian Nicholls
99 Whalley Road
Read
Nr Burnley
Lancs

Computer Surround

A new game for Spectrum by D Oxley

This game entails manoeuvring a representative figure of a man around the screen while avoiding green blocks as they appear. You score points by covering as much of the screen as possible and by directing your man to hit a blue flashing square. The game ends if your man hits a green block.

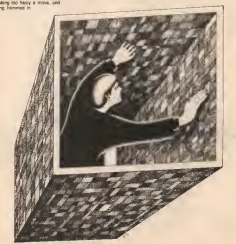
There are four levels of difficulty. To move around the screen use *Q* for Up, *Z* for Down, *I* for Left and *P* for right.

If you hit a special harlequin black and blue flashing square the screen clears and you move up one level of difficulty.

The only strategy to the game is staying alert, not making too hasty a move, and avoiding being hemmed in.

Program notes

Line	Function
8	Input sets input lines to *Border* colour
10-70	Set up user-graphics by a simple and easy method
110	Tells computer to wait until you press a key
120-130	x1 and y1 are directions for player movement and also make sure that you stay on the screen
140	Checks if you hit a green block
145	Checks whether you hit a graphics 8. If so increases score and difficulty and clears screen
150	Checks whether you hit a flashing blue block
160	Erases old position, uses logic to print correct figure at new position
200-250	For each level of difficulty the computer tries to print a green block around the player position
260	Possibly prints a graphics 8
400-430	Sound end of program and print mini-explosion
435	Does a loop of *Out (Fe)*, n to produce random border and clicks.
500	Sound for hitting a flashing blue block.
510	Changes blue block into green block
520	Increases score by 100
1000-1130	Instructions
1200	Define a random number function



```
1 REM ************************
2 REM *  Computer Surround   *
3 REM *                      *
4 REM *  © D.R.Oxley  1982   *
5 REM ************************
10 BORDER 1  INPUT ""  GO SUB
1000
20 FOR n=USR "a" TO USR "f"-1
30 READ a  POKE n,a  NEXT n
40 DATA -1,129,a,a,a,a,a,-1
50 DATA BIN 1100,a,BIN 1111001
,BIN 11011110,BIN 11000,BIN 1100
00,BIN 11001000,BIN 10000
60 DATA BIN 110000,a,BIN 10011
110,BIN 1111011,BIN 11000,BIN 11
100,BIN 10011,BIN 1000
70 DATA BIN 11000,a,BIN 111100
,BIN 1011010,BIN 1011000,BIN 100
100,a,0
79 DATA BIN 10001001,BIN 10010
10,BIN 11000000,3,0,BIN 101001
0,BIN 10010001
80 LET s=0
85 BORDER 1  INPUT "Difficulty
level (1 TO 4)  ",di  IF di<1 O
R di>4 THEN GO TO 85
90 FOR t=20 TO 40  BEEP .01,t
BEEP .02,20-t  NEXT t
95 PRINT AT 0,20; PAPER 1; INK
7; BRIGHT 1;"Difficulty ";di
100 LET x=0  LET y=1  IF NOT s
THEN GO TO 110
110 IF INKEY$<>"i" AND INKEY$<>
"p" AND INKEY$<>"q" AND INKEY$<>
"z" THEN GO TO 110
115 LET s=s+5*di  PRINT AT 0,0;
PAPER 3; INK 0;"PRESENT SCORE "
;s
120 LET x1=(INKEY$="p" AND x<31
)-(INKEY$="i" AND x)
130 LET y1=(INKEY$="z" AND y<21
)-(INKEY$="q" AND y>1)
140 IF ATTR (y+y1,x+x1)=32 THEN
 GO TO 400
145 IF ATTR (y+y1,x+x1)=100 THE
N FOR p=30 TO 50  BEEP .01,p  NE
XT p  LET s=s+200  CLS  LET di=
di+(di<4)  GO TO 120
150 IF ATTR (y+y1,x+x1)=207 THE
N GO TO 600
160 PRINT AT y,x;" ";AT y+y1,x+
x1;"*" AND (x1=1 OR s=0);"*" AND
 x1=-1;"#" AND y1
170 LET x=x+x1  LET y=y+y1
180 BEEP .02,30  BEEP .01,40
200 FOR g=1 TO di  LET p=FN r(3
)-1ey  LET q=FN r(3)-1+x
210 IF x=q AND y=p THEN GO TO 2
00
220 IF p<1 OR p>21 OR q<0 OR q>
31 THEN GO TO 250
230 PRINT AT p,q; PAPER 4; INK
3;" "
250 NEXT g
260 IF RND>.98 THEN PRINT AT FN
 r(21)+1,FN r(32); FLASH 1; BRIG
HT 1; PAPER 1; INK 7;" "
270 IF RND<.01 THEN PRINT AT FN
 r(21)+1,FN r(32); PAPER 6; INK
0; FLASH 1;"#"
280 GO TO 110
400 FOR a=60 TO -40 STEP -2  BE
EP .04,a  NEXT a
410 FOR b=1 TO 3
420 BEEP .02,36  BEEP .01,40
430 NEXT b  PRINT AT y,x;"*"  F
OR p=0 TO 8  NEXT p  PRINT AT y,
x;" "
436 FOR p=0 TO 120 STEP 3  OUT
254,p  NEXT p  CLS  BORDER 1
440 PRINT AT 10,0;"You scored "
;s;" points"'''"***  Well  Done
***"
450 PRINT ' PAPER 4;" Would you
 like to play again ? "
460 IF INKEY$="y" THEN RUN 80
470 IF INKEY$<>"n" THEN GO TO 4
60
480 CLS  BORDER 4  INPUT ""  P
RINT AT 10,4;"© D.R.Oxley 1982"
490 GO TO 490
600 FOR a=30 TO 40 STEP 3  FOR
b=a TO a+8 STEP 8  BEEP .03,b  N
EXT b  NEXT a
610 PRINT AT y+y1,x+x1; PAPER 4
; INK 0;"□"
620 LET s=s+100
630 GO TO 110
970 REM ****************
980 REM * Instructions *
990 REM ****************
1000 CLS
1010 PRINT "  Welcome to Compute
r Surround."
1020 PRINT ' PAPER 6;" In this g
ame, you score points by staying
 alive and moving overthe playin
g area.                You score
 100 points if you hita blue & w
hite flashing square, "
1030 PRINT PAPER 6;"and if you h
it this: ", FLASH 1;"#", FLASH 0
;" it will  clear the screen and
 increase   the difficulty.
"
1040 PRINT PAPER 4;" At the star
t, you are asked forthe difficul
ty level between    1 and 4, 1 b
eing the easiest.   What this m
eans is that the    number of bl
ocks which are      printed arou
nd you each time    increases un
til it reaches 4.   "
1050 PRINT PAPER 3;" If you coll
ide with a block,   the game end
s and you are asked whether you
want to play again. "
1060 INPUT FLASH 1;"    Type EN
TER to continue    ", LINE a$
1070 CLS
1080 PRINT "To move around the p
laying area."
1090 PRINT '"    'Q' ... Up"'"
    'Z' ... Down"'"    'I' ...
Left"'"    'P' ... Right"
1100 PRINT ''TAB 8;"Easy, isn't
it!"
1110 PRINT ''' PAPER 1; BRIGHT 1
; INK 7;"  To start playing type
 any key "
1120 IF INKEY$="" THEN GO TO 112
0
1130 CLS  RETURN
2000 DEF FN r(x)=INT (RND*x)
```



John Hollis Quicksilva s Technical Director

Games designers are rare

***David Kelly** talks to John Hollis, Quicksilva's software wizard, about the art of programming*

John Hollis is Quicksilva s Technical Director Since first becoming involved with the company some 18 months ago — designing hardware add-ons for the ZX81 — John has gone on to become Quicksilva s chief programer

As the company has concentrated more and more on software and phased out its hardware activities so John has given up design in favour of programming It seems to be a switch he favours

"The company started when Nick (Lambert) designed a 3K Ram pack for the ZX81 At that time I was working as a hardware engineer designing business systems explains John

I had known Nick from years back — we are old buddies Anyway I got involved when Quicksilva did the ZX81 colour board — I got that working Then we followed that with the Character Generator and the Hi res Graphics Board At the same time I did my first software — *Asteroids* for the ZX81 — and the Rom for the Hi res bord

"Everything was going fine until the ZX Spectrum came out We were actually on the point of launching a machine of our own using the Hi-res and Colour boards — we had even found a company to do the Basic

When the Spectrum was released, Nick and I decided that Quicksilva must concentrate on either hardware or software Since the Spectrum provided most of the facilities that we had been trying to give the ZX81 It seemed sensible to concentrate on software

John joined the company full-time in April last year and has been writing software steadily since then First he did *Intruders* for the Spectrum and then *Meteor Storm, Speak Easy* and most recently *Time Gate*

At the moment Quicksilva has about 10 programs in its catalogue — of which John has written about half All that is about to change

'We wanted to do software for other machines, he says "At the end of last year we advertised for software programmers who could write for the Vic, Dragon, BBC and Atari machines Now we have two or three programmers for each of these machines our output should shoot up dramatically — the first of the new software comes out in February with new material for the Vic20 and Atari machines '

Increasing the number of programmers writing for us has given John more time ' Up until *Time Gate* I had my hands tied as far as writing was concerned Nick thought Quicksilva should first build up a solid catalogue of quality versions of arcade favourites It is always a problem — until you have established a reputation for good material you cannot do original software because people want to be sure of what they are buying

"As far as possible Quicksilva will now be concentrating on original game designs Of course, original games take somewhat longer to develop but I can now afford to take more time writing programs Something like *Intruders* takes about a month to write *Time Gate* took nearer 2½ months Now that we have more programers they will provide a steady flow of software while I will be able to concentrate on the more involved games

"I'm a Z80 fiend I have programmed the 6502 and 6809 processors but I prefer the Z80 So for a while I shall be sticking to the Spectrum though the Lynx is looking attractive What I want to do is produce four or five 'special games a year The next one will be better than *Time Gate* You always have to do better than before and you are always learning

"With *Time Gate* I learnt how to do 3-dimensional graphics It also has a strong story element to it and it plays a lengthy game One of the things I'm most interested in is a kind of Adventure/Arcade hybrid

The way in which a game is written is planned quite carefully — pretty early on in the development it is decided if it will work as an idea or not If an idea is no good it is quickly shelved

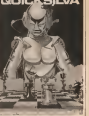
"In a way *Time Gate* arose out of a need of the company says John "We wanted an extra special program

It took about a week to put the ideas together I usually start with the screen layout and the story line It had to be 3D but better — 4D That s where the *Time Gate* idea came from All of us here read a lot of science fiction and when I told Mark (Eyles) about the ideas he helped develop the plot

' Having got a static display written in Basic just to see what it looked like on the screen I then tried to get it to move The main problem was the stars — it was a question of looking in books to find out how the illusion of 3D works You always do the most difficult bit of a program first — that way you find out early on if it is going to be impossible to write the game

"I first tried moving the stars out linearly from the centre of the screen — that gave the impression of them moving more slowly at the outside of the screen I tried several ways of speeding them up at the edges but none of them was right

"I'm a very poor mathematician — I failed 'O' level — but if I really have to find something out, I find out! After I had suffered with the maths book for a while I realised that what I needed was a cosine rule I reckon it was the first time I'd used cosines!



When John discovered that it was quite straightforward to finish the program he worked out a table of cosine values which the program uses to plot the stars

'One other strange problem I found was if all the stars started at the same point on the screen, it gave the illusion that

someone was throwing them at you I got round that by having them generated around a central point, with a random element When I incorporated that into the program it suddenly worked — the illusion of moving through space was there

"Once that was done all I had to do was get the console working and build in the *Time Gate* and the Planet Landing routines

"Everyone at Quicksilva is surprised and pleased at the response to the game It is now selling in greater numbers than all the company's other games put together!

"Since I finished *Time Gate* I haven't had time to do any coding I needed a rest after completing it and then there was Christmas but I have designed three more games and I shall start coding next week You should see something out of me in the next month or two!

In John's view a good game should make full use of the computer hardware of a particular machine "If its got hi-res and sound then you must use them Most machine-code games have a delay loop in them to make them slow enough to play You can easily use that time to enhance the sound or graphics of the program

"The Spectrum just has the *Beep* sound command If you want good sound you can use the spare computer time to generate good sound effects built up using software Alternatively you can use the time to move the display graphics pixel by pixel rather than character-square by character-square

He says that, for a game to be successful, it must be possible for a beginner to play yet it must get harder as the game goes on, making it difficult for an expert to play

"Hard-core arcade game players like Nick — he has his own *Defender* Arcade machine — like one sort of game and that may not appeal to everyone

"Personally I loved the film *Tron* It was excellent — that's the sort of feel a program should have A large part of the film was done using animation techniques rather than computer graphics but I think that is the sort of thing one should be aiming for I know you cannot get those sorts of effects on the Spectrum for example but by squeezing performance out of a machine you can do a lot!

"One of the most important things you can do is prepare yourself with the proper software tools before you begin to code The first thing we did when we got a Spectrum was to write a library of sub-routines as program-writing aids

"When I'm coding I use a modified Nascom II with a whole range of assemblers disassemblers, monitors and debuggers on it Nobody in their right mind keys in machine-code direct. Although I write on the Nascom I never run it on there — I transfer it across to the Spectrum That way if it crashes I don't lose the program

"Software, if you write it properly has the ability to 'bootstrap You use the first bit you write to help you write the next bit which helps you do the next bit and so on



— you should never have to write anything twice If you have to write any machine-code in direct, then you should write an assembler

"When we did the Rom for the Hi-res board I had to write a line interpreter From the computer's point of view a good internal language interpreter looks a little like Forth For an internal representation in the computer it is excellent, but in terms of the user it is a step backwards — people just don't think in Reverse Polish Notation!

"Maybe the biggest problem with writing



a program is to convert what is in your head into machine-code The sub-routine library that John has written for the Spectrum is common to all Quicksilva's material In a way it buffers the programmer from the hardware with a couple of K of code All Quicksilva's programs are built up from scratch

"The one cardinal rule is never to call anything on anybody's Rom — none of our programs use any of the commands in the Spectrum's Rom, for example The reason is quite simple — if the manufacturers change the Rom then your program suddenly won't work It happened to us once with the ZX81 — never again"

The sort of thing that John's sub-routine package does is to set up the colour attributes of a particular character It also sets up the object descriptors These tell the computer if a particular character is an enemy for example and they also give information about which way and with what speed it is moving across the screen

Quicksilva's programs are all built up from the same basic core of code — very similar to the way in which adventure games like the Scott Adams Adventure Series are all built up around the same basic program "There is really, as far as the programing is concerned, very little difference between *QS Intruders* and *QS Meteor Storm*," says John "The two main differences are the character sets and the object descriptors

"The problem with games writing is that a lot of the best programmers couldn't design a game to save their lives — good games designers, as opposed to programmers, are very rare I have a sneaking suspicion that some of the first class games designers may not even have a computer

"As far as Quicksilva's plans for expansion go our aim is to link games designers with the right programmers for their style of presentation This is very similar to the way some American games houses work — they develop games in teams of two — a designer and a coder

Quicksilva has taken on new programmers simply because of the number of machines now on the market each of which has different software requirements "This is the single biggest problem for a software house every time a new machine is released everybody reinvents the wheel with the software Software must be one of the few industries which cannot build satisfactorily on what has been done before — and as long as this state prevails it is difficult to see how software development will progress

"My dream, if you like, is a system to make software machine-independent — to be able to write a program on one machine and instantly transfer it to run on any other machine — regardless of processor

"I have worked out how it could be done — but to actually carry out my idea you would need a team of ace programmers working for much much longer than we could even begin to contemplate ■



Dragon fun

***Keith** and **Steven Brain** look at a selection of software now available for the Dragon.*

Father Christmas arrived early when a parcel of Dragon 32 software arrived for review on Christmas Eve!

As usual the standard of the packaging and instructions varied widely. Fighting off our desire to get straight into battle with the Klingon Empire, we started with those cassettes offering a number of short programs (*Dragon Games 1* and *2*, *Dragon Fun and Games*, *Dragon 32 Cassette One* and *Games Pack One*). Four of these cassettes contained Basic programs, but *Dragon Games 2* was in machine code and we therefore considered it separately.

The best of the other four tapes is *Dragon Fun* and *Games* from Shards Software. The programs are user-friendly, with detailed instructions at the start and extensive use of the Dragon hi-resolution and sound capabilities. *Noughts* is the old favourite, noughts and crosses, on two levels. Our only complaint is that on level one you cannot lose but on level two you do not seem to be able to win. *Brain* is a text-only word-guessing game, of the Mastermind type.

Gold uses a joystick to manoeuvre through a minefield to recover bags of gold. It is quite difficult to avoid the mines — gold can only be collected if you are centrally above it. *Snap* is a computer version of the old card game with nice hi-res displays of the cards. *Anagrams* requires you to solve anagrams of five town names which are chosen at random from a large selection. If you are stuck, there is a neat shuffling routine which rearranges the letters continuously for you.

Donkey is a clever implementation of the children's party game but in this case the tail is moved with a joystick (while blindfolded of course). You are guided by a rising tone towards the correct position. Very nice graphics — even horse-mad sister Katherine appreciated this one.

Dice is a poker-dice type game with good use of low res graphics. *Circles* fills the screen with lettered circles of different sizes and requires you to pair them up — a lot more difficult than you think especially at Christmas.

Artist is rather an abstract name for a program which randomly generates 'art' according to your general instructions and then has the nerve to let the computer judge your masterpiece!

Musical is a clever update of musical chairs which plays a music cassette via the motor on/off function. Further features are a changing coloured display and the option of letting the computer keep track of who is left in the game. A great hit.

Altogether a series of well thought-out programs made better by professional presentation and full use of Dragon facilities. Good work by Shards Software and well worth the money at £5.

In the middle of the road in this category come *Games Pack One* from Gem Software and *Dragon Games One* from J C Morrison. *Games Pack One* seems rather expensive at £7.95 for four games, but we noted that the individual authors are credited and suspect that the royalties have to stretch a long way.

Space Wars, from *Games Pack One*, is very simple and slow and the hi-res display is lost during movement. *Sheepdog* is much better, with a continuous hi-res display of Lassie and her three sheep which must be herded into a pen. This is quite addictive if rather difficult as the dog has a mind of its own and does not always do what you expect. A pity that the dog cannot bark — a display of elapsed time would also add interest.

Torpedo is a good game which puts you at the periscope of a submarine, ready to fire at passing ships. Good use of sound and graphics, especially when you manage to hit a ship!

Snake is well presented using low-res graphics, sound and a joystick. The object is to collect food, which appears at random, without eating yourself or hitting the walls. It starts off easily, but as you grow it becomes more and more difficult for you to manoeuvre.

Dragon Games One offers five games for £5.75, four of which are old favourites (*Othello*, *Breakout*, *Awari* and *Moonlander*). The programs tend to assume the user already knows how to play — more instructions would be helpful.

A nice point in *Othello* is the query whether a black and white tv is in use, in which case the display is altered to make the pieces more visible. *Lander* uses low-res graphics and is quite simple, but not bad for a Basic version.

Best game on this cassette is *Raffles*, in which you must find objects in a dark room without being detected. Very difficult to escape if the dog wakes up!

Video Productions' *Cassette One* gets the booby prize, perhaps the best part of this cassette being the *Index* program at the start which continuously scrolls the instructions. *Earth Defence* is a very basic Space Invaders-type program. *Bars*, *Crosshatch*, *Swpshp*, *Moire*, *Circles*, *Circol* and *Spiral* are all simple pattern generators which could easily have been incorporated into a single program. It seems rather cheeky to call *Swpshp* a program when it consists of six lines, three of which are a copyright (!!!) statement, one clears the screen and the other two could easily fit in a single line (which looks very familiar to us anyway).

Titles is only a labelling subroutine which crashes if you input more than 32 characters. *Viabubble* demonstrates simple sorting, but does not explain what is happening. To describe *Musical Keyboard* as an organ is a gross exaggeration as it is very limited, not to mention tone deaf.



DONKEY (SHARDS SOFTWARE)

The rest of the cassette contains "utility" programs. *Photo* calculates depth of field, but a pocket calculator would be just as useful and a lot easier to carry. *Motoring Costs* may be useful, or at least frightening, but *Tachograph* is really only a demonstration. *Reactance* is a very specialised program for calculating component values for filter circuits and seems out of place. The *Surprise* program at the end is a vast disappointment, merely displaying the company name ad infinitum in large coloured letters — perhaps in an attempt to indoctrinate the user.

Cassette One has recently dropped from £4.95 to £3.95 but even at that price you would do better looking at readers' programs in computer magazines.

Dragon Games Two (J C Morrison) is in a different class altogether. All three programs on the cassette are in machine code. They are of arcade standard, very fast with excellent graphics and sound and very addictive. Any single one of these is worth a fiver, so £6.95 for all three is a bargain.

Snakes must be killed by shooting them in the head before they catch you, but if you miss your problems multiply very fast. We found difficulty getting this program off the computer. Little brother Nicholas (8) has one complaint — if you kill more than 655 snakes in one go, the counter resets to zero, so no one will believe how good you are (but at least it took him an hour or so to reach that score).

Lander looks simple but is actually very difficult, with excellent explosions coming via direct access to the SAM chip. *Invaders* has everything you could want, including we discovered a way of cheating to impress your friends (try moving left off the screen before you first shoot and you will find you have developed immunity to alien fire). These programs are loaded by *Cloadm* and started by *Exec7700* so they



5

GOBLIN CAVES (APEX TRADING)

cannot be stopped or copied. This was one of the few cassettes we had no problem loading, but we trust that tape corruption will not occur to spoil our enjoyment.

Moving on to adventure-type games, *Taipan* (Jaysoft) is a version of the common trading theme which puts you in the China Sea. The basis of the program is OK, and even has some educational value, but it suffers greatly by comparison with the others as it is text only. We noted that ZX81 and Spectrum versions are also available, and assume that this is why graphics have been avoided. On the other hand, at only £4 95 it is not expensive and there is no reason why you could not dress it up with some of your own graphics. Sum Yen the moneylender is supposed to be the bad guy, but to us he seemed more like the listening bank.

Goblin Caves (Apex) introduces a hi-res graphics display of caves into the adventure, but the actual program possibilities are limited. All of the caves look much the same, except that the colour changes sometimes, and your nasty end is signalled only by a text message and some noise. Again you cannot expect too much for £4 95, but we feel most users would be happy to pay a little more for something more substantial.

We were also worried by the great difficulty we had in loading this program. Not only were there numerous I/O errors but also, when loading appeared to have been successful, minor bugs in the program appeared, presumably due to data corruption. We may have been unlucky with our tape, but we would advise readers to check on loading before buying.

Dragon-trek, contained in a neat, custom-made, plastic box and with a detailed 16-page flight manual, was the best presented package we reviewed. It requires one joystick and also keyboard entries. The manual warns you that this is a real-time program — so tea-breaks are at your peril.

Firm	Program	Type	Cost	Value (1-10)
Apex Trading Ltd 115 Crescent Drive South Brighton BN2 6SB	*Goblin Caves*	Cassette	£4 95	4
Gem Software 22 Prestwick Drive Bishop s Stortford Herts CM23 5ES	*Games Pack One*	Cassette	£7 95	8
Jaysoft 6 Wentworth Drive Bishop s Stortford Herts	*Taipan*	Cassette	£4 95	6
J C Morrison 2 Glenadale Street Leeds LS9 9JJ	*Dragon Games One* *Dragon Games Two*	Cassette Cassette	£5 75 £6.95	6 6
Salamander Software 27 Ditchling Rise Brighton East Sussex BN1 4QL	*Dragon Trek*	Cassette	£9 95	10
Shards Software 10 Park Vale Court Vine Way Brentwood Essex	*Dragon Fun and Games*	Cassette	£5 00	8
Video Productions 11 Flordon Road Newton Flotman NR15 1QX	*Cassette One*	Cassette	£3 95	1
Compusense PO Box 169 286D Green Lanes Palmers Green London N13 4HT	*Demon*	Cartridge	£18 40	6



The game is rapid, with excellent use of two alternative hi res displays. It offers many different skill levels, with a range of possible decisions at each point in the game. For example, how much energy should you put in your shields, and is a low-energy (but slow) photon torpedo a better bet than energy-expensive phaser fire?

As well as the Klingon menace, there are super-novae and black holes to avoid and you must ensure that you reserve enough energy to get back to a starbase to refuel. The damage report is an excellent feature, especially as your main display malfunctions if the computer is damaged. Better death than surrender, unless you fancy being demoted to the USS Faerie Queen. Altogether a first-class package. At £9 95 it is a little expensive, but still highly recommended.

The last item was something completely different, the *Demon* Machine Language Monitor cartridge from Compusense. This allows you to gain control of the system and eventually write and debug your own 6809 machine code programs. It is compatible with Basic and in addition to the cartridge area, only occupies memory 0600-0800 (for the *Demon* video display) and 0800-0900 (for *Demon* reserved locations).

It has 12 commands which allow you to examine and change memory, examine and change CPU registers, set breakpoints and run programs. A number of useful subroutines within *Demon* can also be incorporated into your own programs. A 16-page manual, and a Motorola 6809 instruction set summary are included.

Although a few examples are included in the manual, the novice needs a lot more information before being able to use machine code. The monitor was easy to use and is a useful tool for those who have conquered Basic and want to move on to the heights (or is it depths?) of machine-language programming. It has the advantages over tape-based monitors of using minimal memory and being instantly available, and is reasonably priced at £18 40.

Our general impression of this sample of independent software is that some excellent material for the Dragon is becoming available, but that the user must ensure he is not buying a pig in a poke. ■

OPEN FORUM

Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed. We will pay the _Program of the Week_ double our new fee of £6 for each program published.

Music

on Jupiter Ace

To start the music program you must define a variable to set the length of the notes. In this program all notes will be the same length. The variable *Qua* will be used

```
200 VARIABLE QUA
```

Now you can define the word, *Music* as

```
DEFINER MUSIC DOES> @ QUA @ BEEP
```

This enables you to store the data for the notes in a very efficient way. Now the boring bit — the data is put in as variables thus

```
478 music C
426 music D
379 music E
358 music F
319 music G
284 music A
268 music B8 (stands for B flat)
238 music C+ (an octave above the other C)
213 music D+
201 music E8+
179 music F+
190 music E+
```

You can of course define further notes, but these should be sufficient for an example program. Next, a word *Part 1* is defined

```
PART1 F G A C+ B8 B8 D+ C+ C+ F+ E+ F+
  C+ A F G A
```

Next a word *Part 2*

```
PART2 PART1 B8 C+ D+ C+ B8 A G A F E F G C
  E G B8 A G
```

And a third word

```
PART3 PART2 A PART1 D C+ B8 A G F C F E F A
  C+ F+ C+ A F A C+
```

The word to run this demonstration program is *Bach*

```
BACH PART3 179 QUA @ 3 * BEEP
```

Typing in *Bach* should now run the program. If any problems are encountered then a word *Scale* should solve them

```
SCALE C D E F G A B C+ D+ E+ F+ SCALE
```

which is a clever way of producing an infinite loop (instead of *Begin 0 Until* as suggested by the Ace manual) by getting the word to call itself. *Scale* just gives a repeating scale of notes (until you press *Break* so not use *Fast* mode) so you can decide if a note is badly defined

This method is more efficient in memory terms than that suggested by the manual and is a useful addition to games. The words can be used inside words as well as in immediate mode

The program can be slowed down to a more sedate speed by

```
300 QUA !
```

which resets the variable *Qua*

Music
by Martin Sudworth

Graph

on BBC Micro

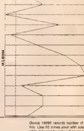
When data is presented in numerical form it is often hard to comprehend. Displaying these numbers graphically is much easier to understand. This procedure is extremely useful as it accepts any number of arguments (floating-point and negative) scales them and plots them on a grid in the form of a graph. A title and two labels (for the X and Y axis) are displayed and positioned on the screen automatically. When both negative and positive numbers are used a line is drawn to show the zero mark

Before calling this procedure the machine must be in MODE1, also an array A( ) has to be set up containing the necessary data for the graph. There are four variables which have to be passed when called, the first (T$), is the title, the second (XL$), is the label for the X-axis, the third (YL$), is the label for the Y-axis and lastly (D%), the length of the array

Line 1010 makes the variables local so that if similar names are used outside the procedure, they will not be affected

This procedure is for the BBC Model B by using MODE 4 and changing all colours to white, it will run on a Model A

```
   5 REM**GRAPH PROCEDURE**NHT OCT, '82**
  10 MODE 1 NUM=12 DIM A(NUM) FOR LOOP=1 TO NUM A(LOOP)=RND(20)-5 NEXT
  20 PROCGRAPH("SALES RESULTS","MONTH","PROFIT/LOSS",NUM) *FX 15,0
  30 A=GET RUN
1000 DEFPROCGRAPH(T$,XL$,YL$,D%)
1010 LOCAL LO,HI,L%,SCALE,Step%,X%,Y%,T,QW%,ZERO
1020 VDU 19,2,2,0,0,0,19,1,5,0,0,0
1030 LO=0 HI=0 FOR L%=1 TO D% IF A(L%)>HI HI=A(L%)
1040 IF A(L%)<LO LO=A(L%)
1050 NEXT T=ABS(LO) HI=HI+T FOR L%=1 TO D% A(L%)=A(L%)+T NEXT
1060 CLS GCOL 0,1 VDU 5 MOVE 640-((LEN(T$)/2)*32)+50,1023 PRINT T$
1070 MOVE 640-((LEN(XL$)/2)*32)+50,36 PRINT XL$
1080 QW%=512-((LEN(YL$)/2)*32) FOR L%=1 TO LEN(YL$) MOVE 0,QW%+(L%*32)
1090 PRINT MID$(YL$,(LEN(YL$)-L%+1),1) NEXT Step%=1230 DIV D%
1100 GCOL 0,2 FOR X%=50 TO 1280 STEP Step% MOVE X%,50 DRAW X%,990 NEXT
1110 MOVE 50,50 DRAW 50,990 DRAW 1279,990 DRAW 1279,50 DRAW 50,50
1120 GCOL 0,3 SCALE=934/HI MOVE 50,(A(1)*SCALE)+50
1130 FOR L%=2 TO D% DRAW ((L%-1)*Step%)+50,(A(L%)*SCALE)+50 NEXT
1140 DRAW 1280,(A(1)*SCALE)+50 GCOL 0,2 ZERO=(T*SCALE)+50
1150 MOVE 50,ZERO DRAW 1280,ZERO VDU4 ENDPROC
```



Graph
by Neville Thomas

Escape Maza

on Atari

This game will run on either the 400 or 800 with 16K and with the Basic cartridge. The aim is to escape through all three mazes. There is full use of the graphics and sound

Program notes

Add the following lines if you want *System Reset* to restart the game

```
6 POKE 2 0 POKE 3 6 POKE 9 2 POKE
1536 76 POKE 1537 64 POKE 1538 185 TRAP 17000
17000 RUN
```

6 to 86 Commands for first maze. *Gosub 7000* music *Data* lines (12 14) to draw maze. *Gosub 9000* (9000) gives joystick commands which control the moving pixel. These commands are same for mazes 2 and 3 also. Line 9000 specifically gives time limit for all 3 mazes. Line 82 tests x y co-ordinates for the invisible walls which if positive sends pixel back to start. Line 83 tests to see if pixel is at door of first maze. Line 84 with *Gosub 7000* tests for pixel hitting wall (if positive *Gosubs* 1000-1010) *Gosub 15000* records number of wall hits. Line 85 draws pixel with colour 1 while followed by colour 3 so as not to leave a trail

3000 to 4020 Graphics and sound commands for escaping first maze

5000 to 5180 Commands for second maze. Line 5157 is a test for sending pixel through to the third maze. Line 5158 with *Gosub 14000* tests for pixel hitting wall. If positive *Gosub* 13000-15010

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Continued from page 15

	gives the graphics and sound routine. If negative lines 14020 14030 randomly draw a wall (14030) in maze at a low probability rate (14020). Gosub 19000 randomly places pixel somewhere else in maze as a result of being blasted and thrown from wall
5130 to 6090	Commands for third maze. Line 6076 tests to see if pixel is at else of third maze. If positive lines 6900 to 5070 give graphics and sound commands for conclusion and replay option. Line 6000 with Gosub 7050 tests for pixel hitting wall. If positive sends player back to start of first maze

```
0 POKE 2,0:POKE 3,6:POKE 9,2:POKE 1536,7
6:POKE 1537,64:POKE 1538,105:TRAP 17000
1 GRAPHICS 0:POKE 752,1:SETCOLOR 2,4,1:P
OSITION 0,10:? ,"    ESCAPE MAZE":POSITI
ON 0,12:? ,"    G.C. ROBERTS"
2 POSITION 0,14:? ,"          1982"
3 FOR I=1 TO 255 STEP 4:SOUND 0,I,0,10:G
OSUB 11000:NEXT I
5 FOR T=1 TO 10:SETCOLOR 2,0,1:FOR D=1 T
O 30:NEXT D:SETCOLOR 2,0,7:FOR D=1 TO 30
:NEXT D:NEXT T:SOUND 0,0,0,0
6 GRAPHICS 0:POKE 752,1:SETCOLOR 2,4,8:S
ETCOLOR 1,0,0:RESTORE
7 TIME=0:FOR T=1 TO 23:? "EASY! NOT AS E
ASY AS IT LOOKS!"
8 FOR A=1 TO 5:SOUND 0,INT(RND(1)*250),1
0,10:NEXT A:NEXT T:SOUND 0,0,0,0
9 REM *   <<< MAZE 1 >>
10 GRAPHICS 7+16:COLOR 2:GOSUB 6000
12 DATA 0,0,159,0,159,0,159,90,130,95,0,
90,0,95,0,50,0,40,0,0
13 DATA 10,10,30,10,90,10,80,10,90,10,15
0,10,2,20,10,20,50,20,80,20,100,20,150,2
0,30,30,40,30,50,30,70,30
14 DATA 50,30,90,90,120,90,150,30,40,40,
50,90,70,40,100,40,110,40,150,40,30,50,5
0,50,90,50,150,50,110,30,150,50
15 DATA 40,50,80,60,20,60,80,60,100,60,1
30,50,4,70,30,70,50,70,90,70,100,70,150,
70,20,90,40,50,50,50,70,50
16 DATA 90,80,150,80,24,90,50,90,70,50,0
0,90,10,20,10,80,20,10,20,60,20,80,30,30
,30,20,50,40,30,50,30,50
17 DATA 40,10,40,30,40,50,40,30,90,20,50
,50,50,64,50,94,50,30,60,70,50,80,00,95,
70,2,70,10,70,60,70,50
18 DATA 50,30,80,50,30,70,80,30,30,10,50
,30,50,50,50,20,50,74,90,55,150,30,100,4
0,110,30,110,40,998,998
27 X=156:Y=48
28 COLOR 1:SETCOLOR 2,0,0
29 GOSUB 9000
62 IF MAZE=1 THEN IF X<50 AND Y<40 THEN
GOTO 27
63 IF X<1 AND Y<30 THEN GOTO 3000
64 GOSUB 2000
65 COLOR 1:SOUND 0,0,0,0:PLOT X,Y:COLOR
3:PLOT J,K:GOTO 60
1000 GOSUB 10000
1010 SOUND 0,64,10,8:GOTO 27
2000 READ X,Y:IF X<>998 THEN PLOT X,Y:RE
AD X,Y:DRAWTO X,Y:GOTO 2000
2010 RETURN
3000 X=1:Y=45:FOR T=1 TO 3:FOR C=1 TO 14
:SOUND 0,64,C,C:SETCOLOR 1,C,C:FOR D=1 T
O 35:NEXT D:NEXT C
3005 FOR W=1 TO 20:NEXT W:NEXT T
3010 FOR C=0 TO 15 STEP 3:FOR D=1 TO 10:
NEXT D:SETCOLOR 4,C,7
3020 FOR P=243 TO 31 STEP -7:FOR D=1 TO
5:NEXT D:SOUND 0,P,10,9:NEXT P:NEXT C
3900 GRAPHICS 0:POKE 752,1:SETCOLOR 2,6,
4
4000 POSITION 0,10:PRINT ,,"CONGRATULATI
ONS"
4005 PRINT ,"YOU FOUND A WAY AROUND THE
INVISIBLE WALLS!"
4020 SOUND 0,0,0,0:FOR T=1 TO 800:NEXT T
4030 REM *   <<< MAZE 2 >>
5000 HIT=0:MAZE=0:TIME=0:GRAPHICS 7+16:S
ETCOLOR 1,0,10:COLOR 2:GOSUB 2000
5100 DATA 0,0,159,0,159,0,159,95,130,95,
0,95,0,95,0,50,0,40,0,0,20,10,50,10,50,1
0,150,10,1,20,90,20,40,20,80,20
5105 DATA 50,20,140,20,20,10,20,30,30,0,
30,10,10,30,30,30,30,150,30,44,50,30,
50
5110 DATA 30,30,60,30,110,30,140,30,10,4
0,50,40,110,40,130,40,20,50,36,50,90,50,
30,30,110,50,150,50,0,60,20,60
5120 DATA 24,60,50,50,150,60,100,50,20,7
0,40,70,30,70,76,70,50,70,140,70,10,50,4
0,50,50,80,150,80
5130 DATA 10,40,10,30,70,50,30,95,30,20,
30,30,50,50,40,50,64,30,95,50,10,60,6
0,70,20,80,20,80,30
5140 DATA 50,60,50,70,50,34,30,50,150,30
,150,50,110,30,110,40,140,20,140,30,140,
50,140,70,150,10,150,40
5150 DATA 40,14,40,20,60,54,00,80,70,0,7
0,10,110,30,110,30,150,50,150,50,998,998
5155 X=156:Y=48
5156 COLOR 1:SETCOLOR 2,0,0
5157 IF X<50 AND Y<30 THEN GOTO 6000
5158 GOSUB 9000
5159 GOSUB 14000
5160 COLOR 1:SOUND 0,0,0,0:PLOT X,Y:COLO
R 3:PLOT J,K:GOTO 5150
5190 REM *         MAZE 3 >>
6000 TIME=0:GRAPHICS 7+16:SETCOLOR 1,4,1
0:COLOR 2:GOSUB 2000
6005 DATA 0,0,159,0,159,0,130,95,130,95,
0,95,0,95,0,64,0,50,0,0
6010 DATA 10,10,50,10,50,10,90,10,150,10
,140,10,10,20,80,20,80,20,130,30,140,50,
150,20,30,30,80,30,50,30,110,50
6020 DATA 130,30,140,30,1,40,20,40,50,40
,140,40,20,50,50,30,54,30,130,30,10,50,2
0,60,50,50,36,50,150,60,110,50
6030 DATA 54,70,50,70,120,70,136,70,20,8
0,30,80,40,30,60,50,70,50,140,50,10,50,2
0,90,34,30,36,30,70,90,150,90
6040 DATA 10,10,10,30,10,50,10,36,20,40,
20,60,20,64,20,30,30,34,30,76,30,90,30,9
5,40,30,40,30,50,20,50,30
6050 DATA 30,40,50,76,30,90,30,90,90,1,6
0,10,20,14,70,30,70,64,70,95,30,10,80,20
,50,30,50,40,10,20,10,40
6060 DATA 130,14,130,30,130,84,130,70,11
0,60,110,80,120,20,120,36,130,60,130,70,
140,10,140,30,140,40,140,70
6070 DATA 130,30,130,30,150,30,150,50,15
0,50,130,50,998,998
6072 X=158:Y=55
6074 COLOR 1:SETCOLOR 2,0,0
6075 IF X<3 AND Y<30 THEN GOTO 6900
6076 GOSUB 9000
6080 GOSUB 7050
6090 COLOR 1:SOUND 0,0,0,0:PLOT X,Y:COLO
R 3:PLOT J,K:GOTO 6074
7000 LOCATE X,Y,A:IF A=2 THEN GOTO 1000
7010 RETURN
7050 LOCATE X,Y,A:IF A=2 THEN RESTORE :G
OTO 6
7055 RETURN
8000 X=1:Y=55:FOR S=1 TO 2:FOR I=255 TO
1 STEP -4:SOUND 0,I,10,10
8005 GOSUB 10000:NEXT I
8010 SETCOLOR 2,INT(RND(1)*16),8:NEXT S:
FOR I=255 TO 1 STEP -4:SOUND 0,I,8,10:GO
SUB 11000:NEXT I
8015 WAIT=10:FOR T=1 TO 20:SOUND 0,INT(R
ND(1)*256),10,10:GOSUB 12000:NEXT T:SOUN
D 0,0,0,0
8020 WAIT=3:FOR I=1 TO 255 STEP 4:SOUND
0,I,8,10:GOSUB 12000:NEXT I
8025 SOUND 0,0,0,0
8027 GRAPHICS 2:SETCOLOR 4,4,6
8028 POKE 708,12
8029 POKE 710,0
8030 ? "PRESS THE TRIGGER TO PLAY AGAIN
"
8040 FOR Y=1 TO 900:IF STRIG(0)=0 THEN R
ESTORE :GOTO 6
8050 NEXT Y:GRAPHICS 0:POKE 752,1
8060 POKE 709,12:POKE 710,0:POSITION 0,1
2:"           THE END"
8070 GOTO 8070
9000 TIME=TIME+1:IF TIME=800 THEN GOTO 6
9010 J=X:K=Y:IF STICK(0)=14 THEN Y=Y-1
9020 IF STICK(0)=6 THEN X=X+1:Y=Y-1
9030 IF STICK(0)=13 THEN Y=Y+1
9040 IF STICK(0)=5 THEN Y=Y+1:X=X+1
9050 IF STICK(0)=9 THEN Y=Y+1:X=X-1
9060 IF STICK(0)=11 THEN X=X-1
9070 IF STICK(0)=10 THEN Y=Y+1:X=X-1
9080 IF STICK(0)=7 THEN X=X+1
9090 RETURN
10000 FOR W=1 TO 5:NEXT W:RETURN
11000 FOR W=1 TO 5:NEXT W:RETURN
12000 FOR W=1 TO WAIT:NEXT W:RETURN
13000 GOSUB 19000
13005 FOR I=1 TO 255 STEP 50:SOUND 0,I,8
,10
13010 FOR T=1 TO 15:POKE 710,32+T:NEXT T
:NEXT I:SOUND 0,0,0,0
13012 GOSUB 15000
13015 RETURN
14000 LOCATE X,Y,A:IF A=2 THEN GOSUB 130
00
14020 IF RND(0)*200>2 THEN RETURN
14030 TX=X:TY=Y:COLOR 2:GOSUB 15000:PLOT
 X,Y:GOSUB 15000:DRAWTO X,Y:X=TX:Y=TY:RE
TURN
19000 X=INT(RND(0)*130):Y=INT(RND(0)*95)
:RETURN
15000 HIT=HIT+1:IF HIT=4 THEN GOTO 6
15010 RETURN
17000 RUN
```

Escape Maze
by G C Roberts

Board Game

on Dragon

This program is a two-player game of four in a row for the Dragon 32.

The computer has no part in the program except to display the board of a 1 to 7 and A to K grid. In order to place a piece just enter 3A or A3 and that block will be painted in blue. On the next entry 4A a second colour yellow will be painted.

It would be up to the player with 4 of his/her own blocks in a row to declare a win. To restart a game press the 'X' key, and to end the game press the 'V' key.

Program notes

50	Sets screen
90 to 150	Draw the grid and paint the border
170 to 200	Numbers 1 to 7
250 to 360	Letters A to K
370 to 520	Instructions for next game
530 to 560	Set Flags
560 to 740	Input 1 to 7 and A to K
750 to 800	Paint block and reset flags
810 to 920	Instructions

```
10 REM  - four in a row -
20 '
30 '        BY P.NILL
40 '
50 CLS:PRINT"
   INSTRUCTIONS(YES OR NO)"
60 B$=INKEY$:IF B$=""THEN 60
70 IF B$="Y"TNEN 810
80 PMODE3,1:SCREEN1,0:PCLS
90 ' DRAW GRID 11 LONG 7 DEEP
100 FOR A=10 TO 230 STEP 20
110 LINE(A,10)-(A,150),PSET
120 NEXT A
130 FOR B=10 TO 150 STEP 20
140 LINE(10,B)-(230,B),PSET
150 NEXT B
160 PAINT(1,1),2,4
170 'NUMBERS & LETTERS
180 DRAW"BM3,28;S4;U15"
```

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Continued from page 17

PROGRAM OF THE WEEK

```
190 DRAW"BM3,48;S4,R4LBU6R6U7L8"
200 DRAW"BM3,68,S4;L8R6U7L4R4U7L6"
210 DRAW"BM1,74;S4;U1D10R5U4D8"
220 DRAW"BM3,100;L5R6U7L6U7R6"
230 DRAW"BM1,114;S4,D15R6U7L7"
240 DRAW"BM6,140;S4,U15L7"
250 ' PRINT  LETTERS A - K
260 DRAW"BM21,1,S4,G7E3R7F3H7"
270 DRAW"BM36,1;S4,R6F2G1L8R9F2
    G2L9U7'
280 DRAW"BM67,1;S4;L8G4F3R8"
290 DRAW"BM75,1;S4;R9F4G3L10U6"
300 DRAW"BM105,1;S4;L10D3R7L7D4R12"
310 DRAW"BM126,1,S4,L11D3R9L9D4"
320 DRAW"BM147,1;S4,L8G4F3R8U4L3"
330 DRAW"BM155,1;S4;D7U4R12D4U7"
340 DRAW"BM175,1;S4,R12L6D7R6L12"
350 DRAW"BM194,1;S4;R12L6D5G2H3"
360 DRAW"BM215,1,S4,D7U4R7F4H4E3G3"
370 ' TO PLAY AGAIN HIT XX..
380 DRAW"BM65,160,S4,R12L6D8"
390 DRAW"BM80,160;S4 R11D8L11U8"
400 DRAW"BM106,160,S4;R11D3L11U3D8"
410 DRAW"BM120,160;S4;D8R8"
420 DRAW"BM140,160;S4 F8H8G8E3R11"
430 DRAW"BM150,160,S4,F6E6G5D3"
440 DRAW"BM40,174;F8H8G8E3R11"
450 DRAW"BM57,174,R11L11G4F4R11
    U5L4"
460 DRAW"BM83,174;F8H8G8E3R11"
470 DRAW"BM97,174;R12L6D8L6R12"
480 DRAW"BM127,174;D8L2H8L2D8"
490 DRAW"BM143,174;D8U4R11D4U8"
500 DRAW"BM160,174;R12L6D8L6R12"
510 DRAW"BM178,174,R12L6D8"
520 DRAW"BM200,174,F8H4G4E8"
530 F3=0:' FLAGS..
540 F1=0:F2=0:' PAINT BLOCK
550 A$=INKEY$
560 IF A$="X" THEN 10
570 IF A$="1"THEN C=25:F1=1
580 IF A$="2"THEN C=45:F1=1
590 IF A$="3"THEN C=65:F1=1
600 IF A$="4"THEN C=85:F1=1
610 IF A$="5"THEN C=105 F1=1
620 IF A$="6"THEN C=125 F1=1
630 IF A$="7"THEN C=145:F1=1
640 IF A$="A"THEN D=25:F2=1
650 IF A$="B"THEN D=45:F2=1
660 IF A$="C"THEN D=65:F2=1
670 IF A$="D"THEN D=85:F2=1
680 IF A$="E"THEN D=105 F2=1
690 IF A$="F"THEN D=125 F2=1
700 IF A$="G"THEN D=145:F2=1
710 IF A$="H"THEN D=165 F2=1
720 IF A$="I"THEN D=185:F2=1
730 IF A$="J"THEN D=205:F2=1
740 IF A$="K"THEN D=225:F2=1
750 ' PLACE COUNTER..
760 IF F3=1 AND F1=1 AND F2=1 THEN
    PRINT(D C) 2,4:F3=0 GOTO 540
770 '*****************************
780 IF F3=0 AND F1=1 AND F2=1 THEN
    PAINT(D,C),3,4:F3=1 GOTO 540
790 '
800 GOTO 550
810 '  - INSTRUCTIONS -
820
830 CLS:PRINT:PRINT" THIS IS A TWO
    PLAYER GAME OF"
840 PRINT" four in a row "
850 PRINT" THE FIRST PLAYER TO
    CONNECT "
860 PRINT" FOUR OF THEIR BLOCKS
    TOGETHER"
870 PRINT" WINS THE GAME "
880 PRINT@360,"HIT 'V' TO END"
890 PRINT@440," PRESS A KEY TO
    START..."
900 C$=INKEY$:IF C$=""THEN 900
910 IF C$="V"THEN END
920 GOTO 80
```

Board Game
by Paul Hill

Vardump

on Spectrum

This program in Basic for the ZX Spectrum, will list out all the variables from the variables area. The values of string and numeric variables and for-next counters are listed, but only the size(s) of each dimension are listed for string and numerical arrays, although a simple modification could remedy this.

If after running a program Vardump is merged followed by a command *Goto* 9980 all variables will be listed in the order they were defined. (*Run* will of course erase them.) The few variables used by Vardump will be listed last, unless any were used by the main program in which they will appear earlier in the listing but displaying the current Vardump values.

The programming effort required to avoid using any variables was not considered worth the effort, although a machine code program would of course have achieved this. A simple modification could list the output on the printer.

The variables used are

xxx address in variables area. This points to the last byte in the variables area at the end of the dump

xx byte in address pointed to by **xxx**

h For-next count used to step through arrays

z$ Holds name of variable for names more than one letter

Note that the program uses both *Val* and *Vals*. If more variables are defined after Vardump is used then they will appear in the listing after Vardump's variables. A typical dump is shown.

The program is not really suitable for conversion to other machines because it is tailored to the Spectrum functions and variable storage.

Line 9981 Set zzz to start of variables area

Line 9983 End of variables area if zz=128

Lines 9984 to 9989 Determines single letter numeric variable, variable of more than one letter, variable array, for next loop, string and string array respectively

Lines 9990, 9991 determines name of numeric variable of more than one letter

Note that while debugging the program an additional line inserted between 9989 and 9990 containing

'PRINT Error STOP

will prevent the program running amok if lines 9984 to 9989 contain an error.

Vardump
by D S Laurence

Car Race

on ZX81

This program is written for the 16K ZX81. It is a game that is not seen very often and so is more interesting. All the instructions needed to play the game are contained in the program.

You have to steer a ' + ' around a track. The track can be changed by altering lines 320-510. These lines can be deleted after the program has been run providing that you then use goto 20 instead of run. More tracks could be added if required using the same method that I have. The score is based on the number of squares you cover.

Car Race
by Neil Simons

```
10 DIM A$(20,30)
20 LET HS=0
30 LET U=0
50 LET S=0
60 GOSUB 5000
70 CLS
80 LET U=U+1
90 LET K=0
100 LET LAP=1
300 LET X=15
310 LET Y=15
320 LET A$(1)="[graphics]"
330 LET A$(2)="[graphics]"
340 LET A$(3)="[graphics]"
350 LET A$(4)="[graphics]"
360 LET A$(5)="[graphics]"
370 LET A$(6)="[graphics]"
380 LET A$(7)="[graphics]"
390 LET A$(8)="[graphics]"
400 LET A$(9)="[graphics]"
410 LET A$(10)="[graphics]"
420 LET A$(11)="[graphics]"
430 LET A$(12)="[graphics]"
440 LET A$(13)="[graphics]"
450 LET A$(14)="[graphics]"
460 LET A$(15)="[graphics]"
470 LET A$(16)="[graphics]"
480 LET A$(17)="[graphics]"
490 LET A$(18)="[graphics]"
500 LET A$(19)="[graphics]"
510 LET A$(20)="[graphics]"
900 CLS
910 FOR Z=1 TO 20
920 IF Z=1 THEN PRINT AT 1,1,A$(1)
950 IF Z=1 THEN NEXT Z
960 PRINT AT 2,1,A$(2)
1000 NEXT Z
1001 LET M$=INKEY$
1002 LET K=K+1
1003 IF K=1 THEN LET M$="8"
1030 PRINT AT X,Y;" "
1035 IF M$="5" THEN LET Y=Y-1
1040 IF M$="6" THEN LET X=X+1
1050 IF M$="7" THEN LET X=X-1
1060 IF M$="8" THEN LET Y=Y+1
1065 LET S=S+1
1070 PRINT AT X,Y;"+"
1075 IF A$(X,Y)="[graphics]" THEN GOTO 2000
1077 IF X=19 AND Y=15 OR X=18 AND Y=15 THEN GOTO 1100
1080 IF INKEY$<>"" THEN GOTO 1001
1090 GOTO 1020
1100 LET LAP=LAP+1
1110 LET K=0
1120 GOTO 1000
2000 FOR B=1 TO 3
2005 IF B=1 THEN CLS
2008 PRINT AT 6,0;
2010 PRINT "[graphics]"
2020 PRINT "[graphics]"
2030 PRINT "[graphics]"
2040 PRINT "[graphics]"
2050 PRINT "[graphics]"
2060 PRINT "[graphics]"
2070 PRINT "[graphics]"
2080 PRINT "[graphics]"
2085 PRINT
2090 PAUSE 50
2095 PRINT AT 6,0;"[graphics]"
2250 PRINT AT 7,0;"[graphics]"
2260 PRINT "[graphics]"
2270 PRINT "[graphics]"
2280 PRINT "[graphics]"
2290 PRINT "[graphics]"
2300 PRINT "[graphics]"
2310 PRINT "[graphics]"
2320 PAUSE 50
2330 NEXT B
2340 CLS
2365 IF S>HS THEN LET HS=S
2380 PRINT AT 5,0;"SCORE= ";S;" HIGH SCORE= ";HS
2390 PRINT "    YOU COMPLETED ";LAP-1;" LAPS"
2410 PRINT AT 10,0;"PRESS S TO START AGAIN OR          F TO FINISH"
2420 IF INKEY$="S" THEN GOTO 30
2430 IF INKEY$="F" THEN GOTO 2550
2440 GOTO 2420
2550 STOP
5000 CLS
5001 PRINT AT 1,0;"IN THIS GAME YOU HAVE TO MANOEUVRE + AROUND A TRACK KEEPING CLEAR OF THE BARRIERS [graphics] IF THE CAR STOPS THEN PRESS A DIRECTION KEY TO START IT AGAIN."
5010 PRINT
5015 PRINT
5020 PRINT "      PRESS  "8"  TO GO RIGHT"
5025 PRINT
5030 PRINT "      PRESS  "5"  TO GO LEFT"
5035 PRINT
5040 PRINT "      PRESS  "6"  TO GO DOWN"
5045 PRINT
5050 PRINT "      PRESS  "7"  TO GO UP"
5060 PRINT
5070 PRINT "          GOODLUCK."
5075 LET S=0
5080 PRINT AT 21,4;"PRESS C TO CONTINUE."
5090 IF INKEY$="C" THEN RETURN
5095 LET S=0
5096 IF S=0 THEN LET U=0
5100 GOTO 5090
9998 SAVE "RACE"
9999 GOTO 20
```

Chase

on Jupiter Ace

This program is called Chase and is fast and great fun to play. You are the inverse "A" in the middle of the screen, the enemy's guided missile is the inverse "E" at the top left-hand corner of the screen. The idea of the game is to dodge the guided missile for as long as possible.

You can move twice as fast as the missile but it can move diagonally which evens the score. You move with the cursor control keys (5,6,7,8) in the normal directions.

[A] = inverse video "A"; [E] = inverse video "E" (I = 1)

Program notes

```
10 VARIABLE X (enter)
15 VARIABLE Y (enter)
 1 VARIABLE A (enter)
 1 VARIABLE B (enter)
: CHASE CLS 10 X ! 15 Y ! 1 A ! 1 B ! BEGIN X @ Y @
AT   A @ B @ AT   INKEY 53 = IF Y @ 2 - Y !
THEN INKEY 54 = IF X @ 2 - X ! THEN INKEY 55 =
IF X @ 2 + X ! THEN INKEY 56 = IF Y @ 2 + Y !
THEN X @ 30 > IF 20 X ! THEN Y @ 30 > IF 30 Y !
THEN X @ 1 < IF 1 X ! THEN Y @ 1 < IF 1 Y ! THEN X
@ A @ = IF Y @ B @ = IF ." GOT YOU! 256 1000
BEEP QUIT THEN THEN X @ A @ > IF A @ 1+ A !
THEN X @ A @ < IF A @ 1- A ! THEN Y @ B @ > IF
B @ 1+ B ! THEN Y @ B @ < IF B @ 1- B ! THEN X @
Y @ AT ." [A]" A @ B @ AT ." [E]" 256 70 BEEP 0 =
UNTIL ;
```

(To run type CHASE and ENTER.)

Chase
by Andrew Curtis

Tail Blazers

on BBC Micro

There have been few if any programs published for the BBC which use the joysticks. Although the potentiometer joysticks may not be as good as the joysticks for the ATARI or the VIC, many programs are better with the joysticks.

I have written a simple game for two players. On the keyboard, two players would be controlling four keys each which would be rather squashed. The game itself is very simple. Just control an ever-growing line with the joysticks. You must avoid hitting the walls or your opponent. It doesn't sound sophisticated and it isn't but it proves how simple it is to make a program which uses joysticks, and for a game less than 30 lines (excluding REM's) it is remarkably addictive and should keep you and your opponent occupied.

Although I said that potentiometer joysticks are not as good as the switch type, you can, by taking advantage of the fact that you can actually move it in any direction, do many things that you would otherwise not be able to. For example, MISSILE COMMAND would be much better with these joysticks (or TEMPEST perhaps).

Model A owners with analogue to digital converters should use Mode 5 and change the colours in lines 220, 240 and 290.

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```
10 REM*********************
20 REM***TAIL BLASERS****
30 REM**SHINGO  SUGIURA**
40 REM***(C) DEC. 1982***
50 REM*********************
60 MODE2 COLOUR135:CLS:COLOUR0
70 PRINTTAB(1,1),"PRESS FIRE BUTTONS TOGETHER TO START" REPEAT
   UNTIL ADVAL(0)=3
80 PRINTTAB(1,1),SPC(38)
90 GCOL0,1 DRAW1272,0:DRAW1272,1020:DRAW0,1020 DRAW0,0
100 hinc1%=0 vinc1%=0:hinc2%=-0:vinc2%=0
110 X1%=700:Y1%=500:X2%=300 Y2%=500
120 A1=ADVAL(1) B1=ADVAL(2) A2=ADVAL(3) B2=ADVAL(4)
130 IF A1>=52000 THEN hinc1%=-0:vinc1%=0 GOTO170
140 IF A1<=12000 THEN hinc1%=8:vinc1%=0:GOTO170
150 IF B1>=52000 THEN hinc1%=0:vinc1%=4 GOTO170
160 IF B1<=12000 THEN hinc1%=0:vinc1%=-4 GOTO170
170 IF A2>=52000 THEN hinc2%=-8:vinc2%=0:GOTO210
180 IF A2<=12000 THEN hinc2%=8 vinc2%=0:GOTO210
190 IF B2>=52000 THEN hinc2%=0 vinc2%=4:GOTO210
200 IF B2<=12000 THEN hinc2%=0:vinc2%=-4 GOTO210
210 PROCmove1:PROCmove2:GOTO120
220 DEFPROCmove1 GCOL0:4
230 X1%=X1%+hinc1%:Y1%=Y1%+vinc1%
240 VDU26 C1%=POINT(X1%,Y1%):IF C1%=1 OR C1%=4 THEN PRINT"BLUE
    DEAD!":END
250 PLOT69,X1%,Y1%
260 ENDPROC
270 DEFPROCmove2:GCOL0:1
280 X2%=X2%+hinc2% Y2%=Y2%+vinc2%
290 VDU26 C2%=POINT(X2%,Y2%):IF C2%=4 OR C2%=1 THEN PRINT"RED
    DEAD!" END
300 PLOT69,X2%,Y2%
310 ENDPROC
```

Tail Blasers
by Shingo Sugiura

Vic Printing

on Vic20

The manual supplied with the Vic1515 printer states that abbreviated entries are not possible for the Print# command. I have found, however, that this is not true and that typing P shift R gives the Print# command on subsequent listing. The Vic Super Expander cartridge enables simple assigning of functions to the eight function keys and the manual describes how this is done though does not say that assigning function keys in this way can be done via a program.

The following program both illustrates how function keys may be assigned in a program and also allows single key entries for the most commonly used printer commands.

Vic Printing
by John Pall

```
READY.

10 KEY 1,"OPEN1,4,0"+CHR$(13)
20 KEY 2,"OPEN1,4,7"+CHR$(13)
30 KEY 3,"CMD1"+CHR$(13)
40 KEY 4,"LIST"+CHR$(13)
50 KEY 5,"PRINT#1,"
60 KEY 6,"PRINT#1,CHR$(14)"
70 KEY 7,"CLOSE1"+CHR$(13)
80 KEY 8,"KEY"+CHR$(13)
90 PRINT"J"
100 PRINT"#THIS PROGRAM SETS THE"
110 PRINT"#FUNCTION KEYS -"
120 PRINT
130 PRINT"F1=OPEN IN STD MODE"
140 PRINT"F2=OPEN IN U/L MODE"
150 PRINT"F3=COMMAND MODE"
160 PRINT"F4=LIST DIRECT"
170 PRINT"F5=PRINT DIRECT"
180 PRINT"F6=DOUBLE WIDTH"
190 PRINT"F7=CLOSE"
200 PRINT"F8='KEY'LIST"
210 PRINT"#FUNCTIONS REMAIN WHEN
    THIS PROGRAM IS CLEAR"

READY.
```

```
THE PROGRAM REQUIRES THE 'SUPER EXPANDER CARTRIDGE AND THE VIC 1515 PRINTER.
KEY 8 LISTS THE NEW FUNCTIONS AND ENABLES CHANGES TO BE MADE AS USUAL.
  I CALL THE PROGRAM 'INITIALISER' SINCE IT RESETS THE FUNCTION KEYS IN SUCH A
WAY THAT THEY WILL RETAIN THEIR NEW FUNCTIONS UNTIL MANUALLY ALTERED OR THE
COMPUTER IS SWITCHED OFF.
    ONCE RUN THE PROGRAM CAN BE DELETED.
```

Clock

on Vic20

This program runs on a Vic20 with additional super expander. It first asks you the correct time in the form Hours Minutes and Seconds. It then continues to draw the clock face. The next stage of the program draws the fingers and prints the time in the top left of the screen. In line 22 I have not used the *PI* sign used on the Vic as the printer I used for this program had no *PI* sign.

Program notes

22	Gives the variable *PI* the value of 3.142
25	Clears the screen
30 to 40	Asks for the time, sets the colour and graphic mode
60 to 130	Works out the value of TI$ into the co-ordinates
140 to 190	Draws and un-draws the fingers.
200 to 210	Puts the time in the top left of the screen
220	Loops the program.
240 to 270	Draws the hour portions
280 to 310	Draws the minute portions.

```
10 REM********CLOCK BY R.TINMAN********
20 REM***ON VIC WITH SUPER EXPANDER***
22 PI=3.142
25 PRINT CHR$(147);
30 INPUT"TIME(HH/MM/SS)";TI$
40 COLOR0,0,1,1:GRAPHIC 2
50 GOSUB 230
60 X1=30-VAL(RIGHT$(TI$,2))+1
70 X=30-VAL(RIGHT$(TI$,2))
80 M=30-VAL(MID$(TI$,3,2))
90 M1=30-VAL(MID$(TI$,3,2))+1
100 H=30-VAL(LEFT$(TI$,2))
110 A=X/30*PI:A1=X1/30*PI
120 B=M/30*PI:B1=M1/30*PI
130 C=H/6*PI
140 DRAW0,500+400*SIN(A1)*.7,500+400*COS(A1)TO500,500
150 DRAW1,500+400*SIN(A)*.7,500+400*COS(A)TO500,500
160 DRAW1,500+350*SIN(B)*.7,500+350*COS(B)TO500,500
170 IF RIGHT$(TI$,2)="00" THEN:DRAW0,500+350*SIN(B1)*
    .7,500+350*COS(B1)TO500,500
180 DRAW1,500+250*SIN(C)*.7,500+250*COS(C)TO500,500
190 IF RIGHT$(TI$,4)="0000" THEN:DRAW0,500+250*SIN(C)*
    .7,500+250*COS(C)TO500,500
200 CHAR0,0,LEFT$(TI$,2)+":"
210 CHAR0,3,MID$(TI$,3,2)
220 GOTO60
230 REM DRAW CLOCK FACE
240 FORQ=1 TO 12
250 W=Q/6*PI
260 DRAW1,500+500*SIN(W)*.7,500+500*COS(W)TO500+430
    *SIN(W)*.7,500+430*COS(W)
270 NEXTQ
280 FOR Q=1 TO 60
290 W=Q/30*PI
300 DRAW1,500+500*SIN(W)*.7,500+500*COS(W)TO500+480
    *SIN(W)*.7,500+480*COS(W)
310 NEXTQ
320 RETURN
```

Clock
by R. Tinman

Battlestar

Battlestar is a computer moderated, play-by-mail game devised specially for *Popular Computing Weekly* by Starlord organiser Mike Singleton.

The object of the game is to find the treasure vault on Knox II one of the Empire's fortress planets located near the outer rim of the Milky Way. But to find the treasure vault you will have to beat 244 other players.

In order to limit numbers to a manageable size, we have devised a preliminary competition (see form alongside). But hurry, only the first 245 correct solutions will be entered into *Battlestar* proper.

Entries for the *Battlestar* competition will close on January 31. The solution to the preliminary competition will be published on February 3.

Prizes

(a) The winner will receive a ZX Spectrum
(b) The four losing semi-finalists will each receive a ZX81
(c) Each of the 245 winners of the preliminary competition will receive a voucher entitling them to £10 off a ZX Printer

Popular Computing Weekly Battlestar

To enter *Battlestar* all you have to do is answer the five questions below, fill in your name, address and telephone number, and send the form with a SAE to *Battlestar*, *Popular Computing Weekly*, Hobhouse Court, 19 Whitcomb Street, London WC2.

Rules

a) Each entry must be made on a form cut from *Popular Computing Weekly*
b) Only one entry per person
c) Closing date for entries is January 31
d) The Judges' decision is final
e) No employees of Sunshine Publications Ltd, or their families, will be eligible to enter *Battlestar*

Questions

1) Which actor played Han Solo in *Star Wars* and Deckard in *Blade Runner*?
2) Which film is the sequel to *Star Wars*?
3) What do the letters *MCP* stand for in the film *Tron*?
4) What are the names of the two robots in *Star Wars*?
5) Where is *ET* trying to phone?

Name SIMON BRAY
Address 40 ROCK ROAD
CAMBRIDGE

Tel No

Answers

1)

2) The sequel to Star Wars is The Empire Strikes back

3) R2-D2 and C3-PO

4)

5)

Keyboard talk

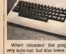
***Jim Parren** explains how to create a keyboard bleep while **Cyril Aubry** draws a circle.*

This program for the unexpanded Vic20 is designed to give a bleep whenever you press a key The machine code routine is called by the *Irq* interrupt every ¹⁄₆₀th of a second This is achieved by altering the *Irq* jump address stored at locations 788 and 789

When the interrupt is called, the processor jumps to the user machine code and tests to see if a key is pressed If a key is pressed, then the sound generator (middle tone) is *Poked* with a note

The note can be changed by changing the value at line 60 in the range 240-255 The volume can be changed by altering the value at line 40 in the range 1-15 The duration of the bleep can be changed by altering line 60 in the range 1 255

You should type in the program and *Save* it before running When *Ready* appears on the screen then pressing any key should result in a bleep — if not then the machine code (lines 20 to 110) should be checked Once the program is entered correctly add line 160 *New*, and *Save* the program

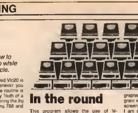


When reloaded the program will not only auto-run but also leave the user Ram clear The program occupies no program memory once *Loaded*, but locates in free space (673-767) in page one of memory This program can thus be used on any Vic

Should you wish to remove the bleep, then press *Run/Stop* and *Restore* simultaneously To restore the bleep type *Sys(673)* This resets the *Irq* vector

Program listing

```
10 X=673
20 DATA 120 169 174 141,20 3 169 2 141 21 3 88
   96
30 DATA 165 203 201 64 240 25 169
40 DATA 5 REM VOLUME
50 DATA 141 14 144 169
60 DATA 246 REM NOTE
70 DATA 141 11 144 162 56 160
80 DATA 255 REM LENGTH
90 DATA 136 236 253 202 208 248 169 0
   141 11 144
100 DATA 169 1 141 129 2
110 DATA 76 191 234
120 DATA 256
130 READ A IF A = 256 THEN 150
140 POKE X,A X=X+1 GOTO 130
150 SYS(673)
```



In the round

This program allows the use of hi-resolution on the unexpanded Vic20 It uses the Vic s inbuilt facility for hi-res graphics After a few seconds, the program will draw a circle (size of the whole screen) It will then make the circle vanish I am sure that even inexperienced programmers will be able to adapt it to their own programs It can be very useful ■

```
1 REM ****************
2 REM      CIRCLE
3 REM ****************
4 REM BY CYRIL AUBRY
5 REM ****************
10 POKE56,24:POKE52,24:CLR
20 G=6144:CO=38400:E=7680
30 FOR I=0TO505:POKECO+I,6:NEXT
40 MAX=192
50 FOR I=0 TO 8*MAX:POKE G+I,0:NEXT
55 POKE36069,254
60 FOR I=0TO505:POKEE+1,0:NEXT
70 J=1
100 N=0
110 FOR T=0TO2*π STEP 2*π/300
120 X=88+40*SIN(T)
130 Y=92+85*COS(T)
140 ON J GOSUB 1000,2000
150 NEXT
160 IF J=1 THEN FOR I=1TO 5000:NEXT
170 J=3-J:GOTO 100
900 XM=INT(X/8):YM=INT(Y/8):M=E+22*YM+XM
910 R=PEEK(M):K=X AND 7:L=Y AND 7:RETURN
1000 GOSUB900
1010 IF R=0 THEN N=N+1:R=N:POKE M,R
1020 C=G+8*R+L:POKE C,PEEK(C) OR(2↑(7-K)):
     RETURN
2000 GOSUB900
2010 IF R=0 GOTO2030
2020 C=G+8*R+L:POKEC,PEEK(C) AND(255-2
     ↑(7-K))
2030 RETURN

READY.
```

Designing characters

This is the second extract from the new book, The Working Dragon 32 published by Sunshine Books Ltd

Module 4 *Lines 1500-1740*

This module is designed to allow the user to move a flashing cursor around the grid printed by the last module inking-in or erasing squares at will Having satisfactorily designed a character a variety of other program functions can be called up by the use of single key codes

Commentary

1550-1610 A variation of our standard 'flashing cursor' routine The cursor is first drawn and then redrawn to the background colour of the square it occupies The whole process cries out for the use of *Get* and *Put* but unfortunately the smallest rectangle which can be *Put* back onto the screen in this *Pmode* is twice as long horizontally as one of our grid elements

1620 Having left the flashing cursor routine at the touch of a key this line checks that the element which has just been redrawn to the background colour does not have to be inked in according to the information stored in the array A

1630-1660 These lines as will be recognised from previous programs move the cursor around the screen In this case the cursor moves in four pixel steps anywhere within the limits of the grid As usual logical conditions are used to control the movement and the required input is one or other of the arrowed keys on the keyboard

1670 The '0 key is used to erase any inked-in element over which the cursor is currently flashing This is done by simply redrawing it the background colour The relevant element in the array A must also be reset to zero otherwise the square will be inked in again every time Module 3 is called up

1680 Pressing 'I' inks in the square and sets the corresponding element in the array A.

1690 Input of 'R rotates the whole grid 90 degrees anti-clockwise when the next module has been entered

1700 Input of 'M will later allow the design to be moved around in the grid

1710 Input of I' transforms the design into its mirror image

1720 Input of E extracts the string necessary to *draw* the character which has been created

1730 Input of 'S results in the string created being saved to tape Note that because this will involve instructions being printed using the text screen the *Screen* command must be used on return to retrieve the high resolution display

Testing

At this point you should be able to move the flashing cursor around the grid inking in or erasing squares at will None of the other functions is yet available and their use will result in an error report undefined line

Module 5 *Lines 2000-2220*

This module performs three of the functions called from the previous module namely rotation inversion and movement of the design within the grid All the manipulations are performed by employing a second array B to which is transferred the data from the array A suitably modified The array B is then copied back into A

Commentary

2030-2050 Examination of the subscripts for the arrays A and B in the first line will reveal that these three lines accomplish the rotation of the data stored in the array A by 90 degrees that is to say that element 0,0 is moved to position 31,0 and so on Having redefined the array A, Module 3 is recalled to draw the modified grid

2060-2180 This subsection accomplishes the movement of the design within the grid In order to understand this function it is first of all necessary to visualise the corners of the grid numbered in the following manner

1 2
3 4

The Working Dragon 32**, by David Lawrence costs £5 95 and is available from* ***Sunshine Books Ltd *Hobhouse Court, 19 Whitcomb Street London WC2 7HF*

Module 4

```
1500 REM***************************
1510 REM CREATE DESIGN
1520 REM***************************
1530 GOSUB 2500
1540 LET X=0:LET Y=0
1550 LET T$=INKEY$ IF T$<>"" THEN GOTO 1620
1560 GOSUB 5030
1570 DRAW "C0;"+D$
1580 FOR I=1 TO 25 NEXT
1590 DRAW "C"+STR$(1-((X+Y)/8<>INT((X+Y)/8)))+D$
1600 FOR I=1 TO 25 NEXT
1610 GOTO 1550
1620 IF A(Y/4,X/4)=1 THEN DRAW "C0;"+D$
1630 LET X=X-4*(T$=CHR$(8))+4*(T$=CHR$(9)) IF X>124 THEN LET X=124
1640 IF X<0 THEN LET X=0
1650 LET Y=Y-4*(T$=CHR$(10))+4*(T$=CHR$(94)) IF Y>124 THEN
     LET Y=124
1660 IF Y<0 THEN LET Y=0
1670 IF T$="0" THEN DRAW "C"+STR$(1-((X+Y)/8<>INT((X+Y)/8)))+D$
     LET A(Y/4,X/4)=0
1680 IF T$="I" THEN DRAW "C0;"+D$ LET A(Y/4,X/4)=1
1690 IF T$="R" THEN GOSUB 2030
1700 IF T$="M" THEN GOSUB 3030 DRAW "C4"+D$ GOSUB 2070
1710 IF T$="I" THEN GOSUB 2200
1720 IF T$="E" THEN GOSUB 3000
1730 IF T$="S" THEN GOSUB 6000 SCREEN 1,0
1740 GOTO 1550
```

Module 5

```
2000 REM***************************
2010 REM ARRAY MANIPULATIONS
2020 REM***************************
2030 FOR I=0 TO 31 FOR J=0 TO 31 LET B(J,31-I)=A(I,J) NEXT J,I
2040 FOR I=0 TO 31 FOR J=0 TO 31 LET A(I,J)=B(I,J) LET B(I,J)=0
     NEXT J,I
2050 GOSUB 2500 RETURN
2060 REM***************************
2070 DRAW "C3;BM150,40;U12;F6;E6;D12" FOR I=1 TO 100 NEXT
2080 LET MX=0 LET MY=0 LET X1=0 LET X2=0 LET Y1=0 LET Y2=0
2090 LET T1$=INKEY$ IF T1$="" THEN GOTO 2090
2100 IF T1$="1" THEN LET MY=Y$-1 LET MX=X$-1 LET X1=X LET X2=124
     LET Y1=Y LET Y2=124 DRAW "BM158,64;R5;BL3;U12;G1"
2110 IF T1$="2" THEN LET MY=Y$-1 LET MX=124-X LET Y1=Y LET Y2=124
     LET X1=0 LET X2=X DRAW "BM162,60;L12;U6;R12;U6;L12"
2120 IF T1$="3" THEN LET MY=124-Y LET MX=X$-1 LET X1=X LET X2=124
     LET Y1=0 LET Y2=Y DRAW "BM150,60;R12;U6;L8;R8;U6;L12"
2130 IF T1$="4" THEN LET MY=124-Y LET MX=124-X LET X1=0 LET X2=X
     LET Y1=0 LET Y2=Y DRAW "BM162,60;L6;U3;D6;U3;L6;U12"
2140 IF T1$<"1" OR T1$>"4" THEN FOR I=25 TO 65 DRAW "C4;BM150,"
     +STR$(I)+";R12" NEXT I RETURN
2150 LET X1=X1/4 LET X2=X2/4 LET Y1=Y1/4 LET Y2=Y2/4 LET MX=MX/4
     LET MY=MY/4
2160 FOR I=Y1 TO Y2 FOR J=X1 TO X2 LET B(I+MY,J+MX)=A(I,J)
     NEXT J,I
2170 FOR I=0 TO 31 FOR J=0 TO 31 LET A(I,J)=B(I,J) LET B(I,J)=0
     NEXT J,I
2180 GOSUB 2500 RETURN
2190 REM***************************
2200 FOR I=0 TO 31 FOR J=0 TO 31 LET B(I,J)=A(I,31-J) NEXT J,I
2210 FOR I=0 TO 31 FOR J=0 TO 31 LET A(I,J)=B(I,J) LET B(I,J)=0
     NEXT J,I
2220 GOSUB 2500 RETURN
```

Channelled drives

***Andrew Pennell** explains how channels can be used to transfer output between the screen and printer*

There is a very useful function in Spectrum Basic that is not mentioned at all in the manual — the use of channels. These will be used by the microdrives and networking facilities for input and output, but they can also be used for several useful effects.

The symbol for channel is the *'hash'* sign on the *2* key. There are 19 channels, 16 of which are accessible from Basic. Channels 0 and 1 are the lower screen, channel 2 is the upper screen and channel 3 is the printer.

These can be used for *Input* and *Output* using the expected commands. For example *Print #0 "Hello"* will produce the message "Hello" on the lowest line of the screen previously unobtainable. Any *Output* here will be destroyed by any system messages such as *'Scroll?'*. *Print #2* is the same as *Print*, and *Print #3* is equivalent to *LPrint*.

Input statements can also be used with channels but there is no advantage in doing this until the Microdrives arrive. Incidentally, *Input #2* and *Input #3* result in error messages.

Another statement for handling channels is the *Open* command, available in *E* mode from *Shift* 4. The general syntax of this function is *Open #A A$* where *A* is the channel number and *A$* the single character filename. Valid filenames are *K S* and *P* which are lower screen, upper screen and printer respectively. Lower case filenames are also accepted.

The action of this *Open* statement is to transfer all output usually sent to channel number *A* to the named second channel. For example *Open #2 "P"* will result in all upper screen output (except automatic listings) being sent to the printer. *Open #3 "S"* achieves the reverse effect and all *LListings* will be sent to the screen. To restore everything to normal, use the *Close* statement.

When the Microdrives are eventually released, new 16K Roms may be required. This is not a wild guess, but based on several facts gleaned from disassembling the Rom. This can best be demonstrated by attempting to *Close* channels 4 to 15 which usually results in a system crash! ■

Printing by command

***Chris Wood** explains how to print on lines 22 and 23 by altering two Rom addresses.*

In order to print on lines 22 and 23 two addresses in Rom must have their contents altered. *DF SZ* (23659) contains the number of lines at the bottom of the screen normally unavailable to the user except through *Input*. Address 23689 contains the address of the next line number to print on.

Poking 23659 with zero enables you to access these lines but you still get an 'out of screen' report. *Poking* 23689 with two allows you to print on line 22 and you can even *Print At 22,n* where *n* is any number up to 31. *Poking* 23689 with one will put your next *Print* statement on line 23 but you cannot print *At* line 23,*n* or the computer will crash.

NB you must also return *DF-SZ* to its value of two before any other command.

```
10 POKE 23659,0: POKE 23689,1
20 PRINT "Press any key": PAUSE 0
30 POKE 23659,2
```

Different cursors

Sometimes the presence of a flashing *L* or *C* can spoil the look of an input statement. It would be less annoying to have a relevant word as the cursor.

Poking 23617, which is the mode of the cursor, with the relevant number, enables you to choose from all the keywords, numbers, graphics shapes and letters. Most of the numbers from 3 to 130 are graphics cursors in disguise but the rest contain about half the key-words. Try experimenting, eg

```
10 POKE 23617,216
20 INPUT FLASH 1;"PRESS ENTER TO ";LINE a$
30 POKE 23617,0
```

To change the colour of the last two lines of the screen, which are the same colour as the *Border* can give interesting results. The address of the *Border* colour is 23624.

```
10 POKE 23624,134: POKE 23617,218
20 INPUT "PRESS ENTER TO ";LINE a$
30 POKE 23617,0
```

You can return the *Border* to normal with a normal *Border* command. Experiment with numbers from 1 to 255 for different colours.

Redefined character set character drawer

There are times when the inability of *Screen$* to recognise user-definable graphics is inconvenient to say the least. Redefining your character set and storing it in Ram gets around this problem admirably as demonstrated in *Popular Computing Weekly* September 30. Unfortunately, if you have a 48K machine the numbers given in this issue will limit you to about 8K to run a program after the computer has taken its bit to run itself.

To find Ramtop, so you can put your character set just below it, type

```
PRINT PEEK 23730+256*PEEK 23731
```

Subtract 1024 from this and remember it as a. Now to find where to point *Chars* type

```
10 LET b=INT(a/256): LET c=a-b*256
20 PRINT c,b
```

These are the numbers you poke into the addresses 23606 and 23607 respectively. To get your character set into Ram type

```
1 LET a=31575-1: CLEAR a: LET a=31575
2 LET d=15360: FOR z=0 TO 1023
3 POKE (a+z),PEEK (d+z): NEXT z
4 POKE 23606,87: POKE 23607,123
```

Note. The numbers *a*, *b* and *c* in the above program are for the 16K machine, 48K owners should use the numbers they obtained previously.

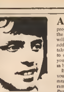
For those of you who like to see what you are changing when you redefine your character set. Program 1 gives you an 8×8 grid to move around in and change your characters. For those who wish to *Save* their new character set, be it the Greek alphabet or space invaders, see page 141 of your Sinclair manual. Again the value of a given in this program is for use with the 16K machine — 48K owners should use their own value. ■

Program 1. Pokes inverted character set to RAM

```
10 LET a=31974: CLEAR a: LET a=31975
15 FOR v=65 TO 126: LET a$=CHR$ v
20 LET b=15360+(8*CODE a$)
30 FOR i=0 TO 7
40 POKE (a+i+(8*CODE a$)),PEEK (b+7-i): NEXT i
50 NEXT v
60 POKE 23606,87: POKE 23607,1
```

Program 2. Grid to draw redefined characters

```
5 LET a=31575: LET r=4: LET c=1
[illegible] different a for 48K
10 PRINT "[illegible]"
20 FOR n=1 TO 8: PRINT "[illegible]
"; INVERSE 1;n
30 NEXT n
35 LET e=0: INPUT "letter? ";e$
39 IF e$="" THEN STOP
40 INPUT "row? (y)";r
45 PRINT AT 10,0;"PRESS [illegible]
[illegible]
[illegible]
50 IF r=0 OR r=9 THEN GO TO 60
60 PRINT AT r,c;"[illegible]"
70 IF INKEY$="8" AND c<8 THEN LET c=c+1: PRINT AT r,c;[illegible]
80 IF INKEY$="0" THEN PRINT AT r,c;"[illegible]": LET e=e-c: LET e=e+2↑[illegible]
[illegible] PRINT AT r,10;e: LET c=c+1
85 IF c>8 THEN GO SUB 110
87 IF INKEY$="6" THEN GO SUB 110: RUN
90 IF INKEY$="1" THEN PRINT AT r,c;"[illegible]": GO SUB 110
95 IF r=9 THEN RUN
100 FOR v=1 TO 60: NEXT v: GO TO 60
110 POKE a+(CODE e$)*8+(r-1),e: LET r=r+1
120 LET c=1: LET e=0: RETURN
```



CONVERSION NOT SO SIMPLE

Brian Dale of 27 Dunsdale View East, Porthill Newcastle Staffordshire writes

Q **I am thinking of buying a ZX81 and have been advised that a kit version is better than the ready-built model**

A friend has told me that, according to a handout from a computer show, the 1K static Ram can be connected to the Rom address bus instead of the Z80 address bus The ZX81 then can offer high resolution graphics and use the definable character set as standard. Is this correct?

A This is not correct The conversion you are suggesting is not that simple though it is possible However full details of the modification would demand more space than this entire page

The reason you cannot link up the Ram so easily is that the Ram will not be connected to the Rom Cs it has its own Ram Cs In essence you would need to re-locate eight addresses and data line resistors between the Ram databus and the edge connector It would then need some decoding circuitry which would only bring in the Ram when the character set was called

SUBTRACTING NUMRERS

Paul Mason of Hanworth Bracknell writes

Q **I would like to know how much memory I have left in my Spectrum. I was told that it can be done in the same way as the ZX81, but using different numbers I know how to determine the memory on my ZX81, but I do not know how it works and I do not know what numbers to use for the Spectrum Can you help?**

A You need to find the address at the start of the program and subtract it from the address at the end This will give you the number of addresses that your program takes up As there is one byte to one address this will give you the length of the program in bytes

If you turn to page 165 in your manual you will see a memory map The basic program occupies the space from *Prog* to *Vars* — if you subtract *Prog* from *Vars* it will give you the length of your program

However things are not quite this simple The amount of space you are using extends beyond the amount contained in the *Basic* program section You should at least include the variable so that *Prog* from *E_Line* is more useful If you want to include the working space, then *Prog* to *Stackbot* would be better Chapter 25 of the manual out only gives you the addresses in the system variables that will return these values, but also the correct syntax of PEEKing at them Try this

```
10 LET a=PEEK 23641 + 256*
     PEEK (23641 +1)
(This returns the address of E_LINE)
30 PRINT a
30 LET b=PEEK 23635 + 256*
     PEEK (23635 +1)
(This finds the address of PROG)
40 PRINT"             "
50 PRINT b
60 PRINT
70 PRINT a-b
(This gives E LINE minus PROG is
   the number of bytes in the
   program)
```

This is useful as a demonstration, but is impractical to enter during programming It can be reduced to the following line

```
PRINT (PEEK 23641 + 256 * PEEK
(23641 +1))—(PEEK 23635 + 256
*PEEK (23635 +1))
```

These numbers apply to *Prog* and *E_Line* Change the system variables if you want to find the addresses between other sections of the memory

RETURNING THE REY VALUES

J Lee of Hayes Middlesex writes

Q **In the ZX81 Rom there is meant to be an address that returns the value of a key being pressed Could you tell me the equivalent address in the Spectrum's Rom?**

A On the Spectrum there is a scan of the keyboard every fiftieth of a second The *Code* of the most recent key pressed will be stored in the system variable *Last K*, so a *Peek* at this will give you the last key pressed The command *Peek23560* will return the *Code* 13, because the last key you would have used would be *Enter*

NO, CONNECT UP AS NORMAL

A M Collyer of Montserrat Road, Basingstoke, Hampshire writes

Q **I want to build my own cartridge mother board for my Vic20 Should the various expansion slots be joined in the normal parallel fashion, or should some other method be used?**

A No you connect up the lines in parallel as normal It must be remembered that you should not end any of the lines The usual way is to run the main lines horizontally and tap each of the connectors off vertically

CONTINUOUS SCROLLING

David Dennis of London Road, Isleworth writes

Q **I am having problems with the *Scroll* function on my ZX Spectrum In the manual it says that if you *Poke* 23692 with a number greater than one, it will scroll that many times before asking *Scroll?* I want the screen to stop after about six scrolls, but it will not I tried *Poking* 23692,6 but it only scrolled six lines. When I tried 23692,300 I got an error message.**

A This is a bit confusing If you *Poke* any number above 10 into 23692 you will get a continuous scroll As with all addresses, you cannot *Poke* into it any number greater than 255, so of course you got an error message at your attempt to *Poke* in 300

What you have to do is work out the number of lines you want to scroll and then use a variable to control it Try the following program

```
10 LET a=10
20 FOR b=1 TO 9
30 PRINT b
40 NEXT b
50 PRINT "******" ;a
60 LET a=a +10
70 IF a> 300 THEN STOP
80 POKE 23692,66
90 GO TO 20
```

The variable a counts the number of lines and stops the program when 300 has been reached Obviously you could use this as a sub-routine within a larger program I have *Poked* 23692 with 66 but any number from 10 to 255 will do

GET A NEW ROM

Simon Spruzen of Heath Lane Woburn Sands Milton Keynes writes

Q **Recently I bought a BBC model B micro. Looking through the manual I came across a detailed list of all the *FX calls, many of which cannot be used with the 0 10 system. This is the system I have in Eprom, or so *FX0 tells me! Where can I get a 1.0 chip for my computer?**

Also, my BBC, unlike many photographs I have seen, does not have a slot near the keyboard for a plug-in Rom cartridge. Do you know why not?

A You do not say how recently you purchased the machine By now the BBC machines are coming out with the 1 2 Rom I suggest that you find your nearest BBC dealer and ask him to get you a new Rom

The 0 10 did not meet the advertised specifications, and should have been replaced — was your computer new or secondhand? I would also suggest that you try not to let the dealer talk you into returning your computer as it will then go to Acorn which could mean a long wait Eproms are quite expensive and are worth recovering Apparently some BBC models have an ordinary Rom and it might be harder to get these replaced

Some models of the BBC have a plate or cover over the cartridge slot which might be why you cannot see one on your machine

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Malthus' law

The Reverend Thomas Malthus created something of a stir in 1798. This was the year he became curate at Albury in Surrey and more importantly, the year he published his notorious "Essay on the principle of population".

Malthus noticed that generally speaking the size of population increased at a geometric rate. If the population doubled in 20 years then it would double again in the next 20 years. The means of subsistence — the amount of food produced — could not she would not increase at anything like the same rate.

Malthus predicted that, after a short time, the increase in population would outstrip the means available for its support.

What had happened in previous history was that populations had suffered famines and similar catastrophes, and the populations had been kept in check. To depend on famine and pestilence to reduce the size of populations did not appeal to a Christian and Malthus ideas were influential in Darwin's thought as well as those of many social reformers.

The essay was published at a time when fundamental changes were taking place in agricultural methods. The feudal system in which the vassal rented land from the lord and there was no large-scale integration was in decline. Instead a system involving the enclosure of large tracts of land was being introduced. The new system was far more efficient though it did produce some social unrest. The rapid increase in the efficiency of agriculture together with the declining need for agricultural labour, helped to provide a firm basis to support the industrial revolution.

These changes meant that the Malthusian predictions were circumvented — he had assumed a constant agricultural technology.

Many commentators now consider that the present state of flux — our computer led revolution — most closely parallels the agrarian revolution. As with agriculture, as efficiency increases employment falls, though there may still be growth in output.

As Malthus was writing almost 200 years ago he perhaps would not have been able to comprehend the extent to which the population has grown.

By about 1844 a vast rail network existed and had revolutionised society. Yet it was in that year that Frederick Engels wrote of "The condition of the working class in England".

The problem we now have to face is that, while technology has made large populations possible, now large populations make technology indispensable (see J W Krutch *Human Nature and the Human Condition* 1959).

Malthus was correct. Even now with the massive agricultural surpluses in Europe millions in the world are starving.

Margaret Thatcher in her speech at the IT'82 Conference imagined a scene in which you were able at home to book your summer holiday by an interactive cable network — even down to seeing videos of the places you might visit. As someone else noted later in the day, at the moment holiday firms are having trouble selling holidays to anybody at any price. For firms to succeed, they need customers, and the best customers are not the unemployed.

If the undeveloped world cannot feed itself how can we sell to it? If as seems likely the new technologies mean that the number of hours worked is reduced dramatically we need to consider non-work. If we must have the "haves" and the "have-nots" we need to make sure that the "have-nots" have enough. ■

Boris Allan

Puzzle

Mesaage code

1	■	2	3
	■	4	
	■	5	
6			

Puzzle No 40

ACROSS 2 B 4 $A+B$ 5 $A+7$, 6 A^2
DOWN 1 A^2-AB 2 A^2+B^2 3 $(A-4)^2$

Solution to Puzzle No 35

The message was "Seasons greetings and a Happy New Year from everyone at *Popular Computing Weekly*".

The clues in the question were leap and Christmas Day. This is not a transposition code with letter substitution but the code can be cracked by leaping from one letter to the next — the correct leap being 25 (Christmas Day = 25).

In the program the code is entered into the string A$ and the number of steps to be jumped is input in Line 30. As each letter is used it is crossed off and not counted next time round.

```
10 LET A$ = " [enter code message]" 20 PRINT
"ENTER JUMP REQUIRED" 30 INPUT M 40 LET
C = 0 45 CLS 50 FOR N = 1 TO M 60 LET C = C
+ 1 70 IF C > LEN A$ THEN LET C = 1 80 NEXT N
90 PRINT A$(C) 100 LET A$ = A$(TO C - 1) +
A$(C+1 TO) 110 LET C = C - 1 120 IF A$ = ""
THEN GOTO 200 130 GOTO 50 200 PAUSE 4000
210 CLS 220 GOTO 20
```

Winner of Puzzle No 35

Not one single correct entry this week — excess of alcohol and Christmas pudding must have taken their toll!

Top 10

Atari

1(2)	Air Strike	(English Software)
2(3)	Astro Chase	(First Star Software)‡
3(–)	The Scott Adams Adventures (Adventure International)†‡	
4(–)	Shamus	(Synapse)
5(7)	Jumbo Jet Pilot	(Thorn EMI)*
6(–)	Action Quest	(JV Software)
7(9)	Preppie	(Adventure International)
8(–)	Claim of Death	(Channel 8)‡
9(–)	Star Raiders	(Atari)*
10(4)	Pirates	(Adventure International)

*Cartridge. †24K cassette. ‡32K cassette.
(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

ZX81

1(1)	Sorts Crystal	(Carnell Software)
2(4)	Frogger	(DJL Software)
3(3)	Gauntlet	(Colourmatic)
4(5)	Flight Simulation	(Psion)
5(8)	3D Defender	(JK Greye)
6(7)	Gulp II	(Campbell Systems)
7(6)	Espionage Island	(Artic)
8(2)	Avenger	(Abacus Software)
9(–)	Chess	(Artic)
10(6)	Winged Avenger	(Workforce)

*All 16K
(Figures compiled by Buffer Micro Shop, London 01 769 2887)

Spectrum

1(1)	The Hobbit	(Melbourne House)
2(2)	Penetrator	(Melbourne House)
3(3)	Sorts Crystal	(Carnell Software)
4(4)	Chess	(Silversoft)
5(–)	Meteor Storm	(Quicksilva)
6(6)	Escape	(New Generation)
7(–)	Spectral Invaders	(Bug Byte)
8(8)	Football Manager	(Addictive Games)
9(–)	Hungry Horace	(Psion)
10(8)	Gulpman	(Campbell Systems)

*Requires 48K.
(Figures supplied by Buffer Micro Shop, London 01 769 2887)

Vic20

1(8)	Traxx	(Llamasoft)†
2(1)	Jellymonsters	(Commodore)*
3(4)	Grid Runner	(Llamasoft)
4(7)	Andes Attack	(Llamasoft)†
5(3)	Martian Raider	(Romik)
6(8)	Hopper	(Rabbit)
7( )	Moons of Jupiter	(Romik)†
8(10)	Myriad	(Rabbit)
9(6)	Star	(Commodore)
10(–)	Voodoo Castle	(Commodore)*

*Cartridge. †Requires 3K or 16K.
(Figures compiled by the Vic Centre, London 01-992 8904)

Books

1(1)	Spectrum Machine Language for the Absolute Beginner *Tang*	(Melbourne House)
2(3)	Assembly Language Programming for the BBC Micro *Birnbaum*	(Macmillan)
3(2)	Vic20 Programmers Reference Guide *Finkel*	(Commodore)
4(10)	Spectrum Graphics *Hampshire*	(Duckworth)
5(4)	Discover Forth *Hogan*	(Osborne)
6(9)	Programming the Z80 *Zaks*	(Sybex)
7(–)	Basic Programming for the BBC Micro *Cryer*	(Prentice Hall)
8(6)	Spectrum Book of Games *Jenkins et al*	(Granada)
9(–)	Z80 Assembly Language Programming *Leventhal*	(Osborne)
10(–)	Mastering Machine Code on the ZX81 *Baker*	(Interface)

(Figures compiled by Watford Technical Books, Watford 0923 23324)
(Last week's Watford in brackets)

